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ON

OSTEO-ARTHRITIS:

PATHOLOGY, ÆTIOLOGY, AND PRINCIPLES OF SURGICAL TREATMENT.*

BY A. G. TIMBRELL FISHER, *M.C.*, F.R.C.S. ENG.,

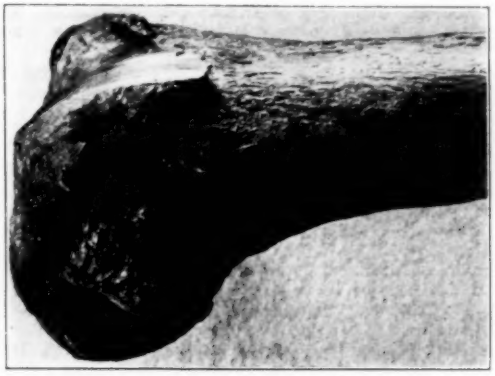
HUNTERIAN PROFESSOR OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND, 1920–21, 1921–22; SURGEON WITH CHARGE OF OUT-PATIENTS, SEAMEN'S (DREADNOUGHT) HOSPITAL, GREENWICH; JOINT LECTURER ON OPERATIVE SURGERY, LONDON SCHOOL OF CLINICAL MEDICINE; RESEARCH STAFF, PRIVY COUNCIL MEDICAL RESEARCH COUNCIL; SURGICAL SPECIALIST MINISTRY OF PENSIONS, ETC.

INTRODUCTORY.

THERE can be no doubt that the condition called by English writers "osteo-arthritis" has afflicted not only mankind, but the lower animals (Figs. 1 and 2), from remote periods in the earth's history. We find its stigmata in the skeletons of prehistoric animals and in human remains of considerable antiquity, for among the bones of ancient Egyptians at the Royal College of Surgeons of England are several exhibiting these changes (Fig. 3). Moreover, we find no race or clime exempt from the disease. The pathological changes are of very great interest and importance from their extraordinary diversity; in one joint we may see the phenomena of repair, inflammation and new growth merging indistinguishably into one another. Moreover, accompanying or following the cellular proliferations are unequivocal signs of degenerations. A striking feature which distinguishes the disease from the more acute and probably infective group of conditions known as "rheumatoid arthritis" is the almost invariable absence of small cell infiltration. There can be little doubt that in osteo-arthritis we are faced with a borderland between a frankly inflammatory condition and a neoplasm of the joint structures. The ætiology of osteo-arthritis is up to the present unknown. Research into this subject is urgently needed, not only for scientific treatment of this extremely common, universal, and crippling disease, but that such a line of research may also eventually throw some light upon the pathogenesis of neoplasms.

In this paper a section is devoted to some largely experimental observations upon joint physiology, because it was felt that our knowledge concerning the basal principles of the physiology of the joints leaves much to be desired, and it was thought that a study of this might throw some light upon the peculiar pathological features of osteo-arthritis. The grosser anatomical features of the disease have been so carefully described by Adams and others that a description of these is purposely omitted. The morbid histology of the earlier stages, which appears to have not hitherto received the attention it deserves, has been investigated more fully in order to ascertain what light these earlier changes might throw upon ætiological problems. Symptomatology and treatment are given in a summarised form from considerations of space, and will receive more detailed consideration elsewhere. The ætiological observations are of a preliminary nature, as research is being continued into this aspect of the problem.

FIG. 3.



Lower end of femur from an Egyptian of the Seventeenth Dynasty exhibiting osteo-arthritic changes. (Spec. 1186 D., Museum of Royal College of Surgeons of England.)

FIG. 1.

Early osteo-arthritic changes in elbow-joint of a rhinoceros.

FIG. 2.

Shoulder-joint of horse (from the Royal Veterinary College) showing marked osteo-arthritic changes.

NOMENCLATURE.

Much of the existing confusion concerning osteo-arthritis can be traced to the fact that many writers have invented descriptive terms for the disease, in which an attempt is made to embody what appears to them to be its principal pathological characteristics. We have already noted how manifold and diverse

* Embodying the Hunterian Lecture delivered at the Royal College of Surgeons of England, and constituting an abstract of a preliminary report to the Medical Research Council, who have generously defrayed the expenses of the research. Published in greater detail in the British Journal of Surgery.

these changes may be. This explains the fact that certain American workers have christened the disease by names which indicate diametrically opposite conditions. Goldthwait, for example, classifies chronic arthritis into (*a*) infectious arthritis, (*b*) atrophic arthritis, (*c*) hypertrophic arthritis. Nichols and Richardson have introduced the terms "proliferative" and "degenerative" arthritis corresponding respectively to the "atrophic" and "hypertrophic" arthritis of Goldthwait or to the "rheumatoid arthritis" and "osteo-arthritis" of English authors.

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It is a healthy sign that modern physiologists are devoting much attention to the structure and physiology of the individual cells—a movement that must lead to significant revelations. Only by study of the individual cells under abnormal conditions can we hope for a clearer comprehension of disease. The complicated problems connected with the ætiology and pathology of osteo-arthritis are so intimately bound up with the structure and physiology of the articular cartilage that it is essential to have a clear idea of its structure and physiology. My researches into the latter furnish, I venture to believe, the clue to many of the pathological phenomena of osteo-arthritis.

Costal Cartilage.—The periphery is formed by a connective-tissue perichondrium. As these connective-tissue cells are traced towards the deeper parts, the cells become larger, although still of connective-tissue type and not surrounded by any matrix. If traced still further these cells indistinguishably merge with the proper cartilage cells. The latter in the central portion of the cartilage are seen to be large somewhat angular cells occurring in groups of two, three, or four cells.

Repair in Costal Cartilage.—It appears that the fully-formed cartilage cells in the centre have little power of undergoing proliferation and that repair takes place by means of the perichondrium. In a Hunterian Lecture upon loose bodies in joints I demonstrated that in those loose bodies of the traumatic or "classical" type which contained both cartilage and bone, and which have been for some time quite free in the joint cavity, the cartilage cells retain their vitality, whereas the majority of the bone cells die. The marked vitality of the cartilage cell when compared with the bone cell requires emphasis in order to explain many of the phenomena of osteo-arthritis.

Articular Cartilage.—It will, perhaps, avoid confusion if we discuss the structure of articular cartilage under two headings—viz., the central and lateral articular areas.

(*a*) Central articular area. The superficial stratum is seen to consist of flattened cells arranged in groups which lie parallel to the surface. If the immediate surface is carefully examined it is found to be constituted by a well-defined regular curvilinear margin devoid of any actual cell covering, and evidently formed of matrix. Henle has described a delicate layer of cells (perichondrium) upon the actual free surface, but investigation convinces me that this must be very rare in the normal adult, although it unquestionably exists at an earlier stage of development. A point of importance is that the horizontal group of cells of the superficial stratum show no sign of degeneracy or diminished vitality, but even in the case of the most superficial the nuclei stain well, and there is no indication that they are other than normal and healthy cells. In the intermediate zone the groups of cells are more irregularly disposed, and in the deeper zone the cell groups are arranged vertically. Ogston's main conclusions were that articular cartilage is continually renewing itself from the focus of central growth and grows in two directions; and that it develops in the direction of the joint an effete layer that is worn away by the joint movements. However, examination of normal articular cartilage reveals no justification for the assumption that it develops towards the joint this effete layer, or that this contributes in any way to the synovial fluid. It seems clear that these superficial cells, far from being degenerate, are the source from which the deeper cells are derived, and that from developmental and other reasons they are analogous to the superficial cells of the lateral portion of the articular cartilage, or to the perichondrial cells of costal cartilage.

(*b*) Lateral articular area. The lateral portion somewhat closely resembles those varieties of hyaline cartilage which are furnished with a perichondrium, for the surface of the cartilage is covered laterally by a delicate extension of the synovial membrane. When traced centralwards, the connective tissue is reduced to a single layer of close-set endothelial cells; these subsequently produce hyaline matrix, in which they become buried, so that the more central parts of the investing cartilage consist at the free surface of matrix—i.e., cartilaginous. At the edge the articular cartilage becomes markedly fibrillated and merges into the fibrous tissue beyond, which is furnished with capillaries, derived from the circulus, without any marked increase of cellularity accompanying the transition. In the thin synovial layer over the lateral articulating area lie capillaries derived from the circulus articuli vasculosus of William Hunter. This lateral part is, therefore, far better nourished than the central. This fact is of fundamental importance and in my opinion is the key to many of the phenomena of osteo-arthritis; for my theory, as will be seen later, is that the central part of the articular cartilage responds to the cause of osteo-arthritis by degeneration, whereas the lateral part proliferates, owing to its richer nutrient supply.

Development of Articular Cartilage.—This difference in structure of the central and lateral portions of the articular cartilage is capable of an explanation on developmental grounds. Towards the termination of the second month of intra-uterine life, the joint cavities have appeared—a split occurring in the mesenchymatous tissue, which usually commences laterally. At the fourth month, the surface of the joint cartilage is still covered by this layer of connective tissue. This is the stage normally found throughout life in certain birds—notably the ostrich. With the increasing movements of the child before birth the perichondrial layer *gradually recedes* from the more central parts of the articular surface, but at birth it still strays for a little way over its edge. Microscopically, however, the connective-tissue layer can be traced beyond the naked-eye delimitation. Shortly after the child begins to walk the extension of the synovial membrane over the lateral margin of the articular cartilage makes a further slight regression but soon assumes its permanent relationship. No perichondrium is present over the more central part, yet there can be no doubt from a study of their structure, staining reactions, and of their development and comparative anatomy that these cells have the same function as the perichondrial cells of the lateral part of the articular cartilage and are the parent cells of the more fully developed cartilage cells in the deeper parts.

Nutrition of Articular Cartilage.

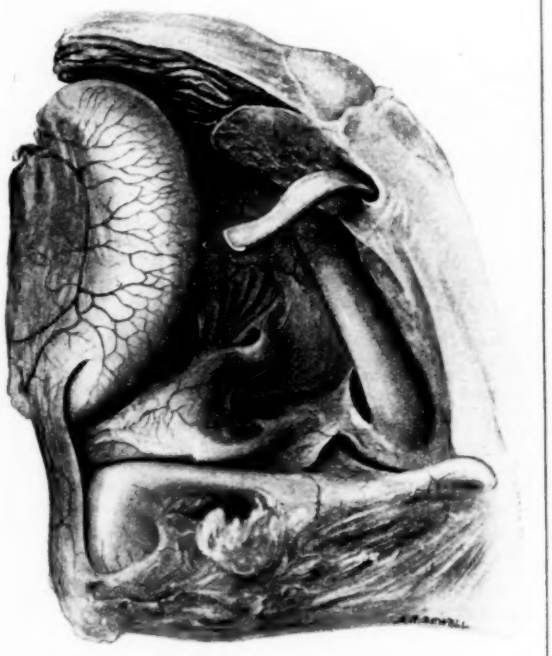
Concerning this question of fundamental importance there has been hitherto a grave lack in our knowledge. In a paper entitled "Of the Structure and Diseases of Articular Cartilages" (Phil. Soc. Trans., Vol. XLII., 742–43), William Hunter first described the circulus articuli vasculus lying near the margin of the articular cartilage, and in younger subjects sending off shoots on to the articular surface as follows:—

> "The distribution of the blood-vessels to the articulating cartilages is very peculiar, and seems calculated for obviating great inconvenience. Had they run on the outer surface, the pressure and motion of the two cartilages must infallibly have occasioned frequent obstructions, inflammations, &c., which would soon have rendered out motions painful, and at last entirely deprived us of them. But by creeping round the cartilaginous brim, where there is little friction, or under the cartilage, where there is none, they are perfectly well defended from such accidents."

The outstanding fact remains that Hunter believed that the circulus plays an important part in the nutrition of articular cartilage. From the developmental point of view and from that of comparative anatomy, the extent to which the minute branches of the circulus penetrate over the articular cartilage depends upon the degree of extension of the synovial membrane over its surface.

Fig. 4 shows the circulus articuli vasculosus in the knee-joint of an ostrich and was probably injected by William Hunter himself nearly 200 years ago. The minute injected vessels stray for a short distance at

FIG. 4.



Showing the injected circulus articuli vasculosus in the knee-joint of an ostrich (Hunterian).
(Specimen B 171, Museum Royal College of Surgeons of England.)

certain spots over the surface of the articular cartilage. Toynbee came to the conclusion that the principle source of nutrition of adult articular cartilage consisted in the lymph exuded from the large and convoluted vessels lying beneath it in the cancellous spaces. There has recently been an attempt to attribute an important part in the nourishment of articular cartilage to the synovial fluid. An argument in favour of this view is the continued growth while free in the joint of loose bodies of the "classical" type. However, a loose body usually acts as an irritant and causes a greater or lesser degree of synovitis with an outpouring of fluid rich in albumin, which cannot in any sense of the word be designated "normal" synovial fluid. My analyses reveal such a low protein content in the normal fluid that it can hardly play more than a small part in nourishing the articular cartilage.

My own conclusions are that the deeper stratum of the articular cartilage is largely nourished in the manner described by Toynbee, that the superficial stratum of the central articular area is nourished by the synovial fluid, and that the remainder of the articular cartilage receives its nutrient supply from the circulus articuli vasculosus. It will be seen that in the infective and toxic types this arterial circle is an important medium by which toxins attack the joint.

The sub-articular bony lamella cannot be said to form an impenetrable barrier, since after an injection of carmine and gelatin the colour readily permeates this zone. Neither can the calcified zone of the articular cartilage be said to form a serious barrier. The question next arises, how does the nutrient fluid gain access to the cartilage cells? No definite lymphatics with an endothelial lining have ever been demonstrated in articular cartilage. Prof. Shattock has recently discovered that if cartilage is stained by carbol-thionin which stains mucin pink, the zone of

FIG. 5.

Osteo-arthritis of knee-joint. Earlier changes in articular cartilage and synovial membrane.

matrix immediately surrounding the cell groups is stained pink, and is evidently the most recently formed and more mucinous part. In a well-stained section it will be seen that the pink zones branch and intercommunicate. In the superficial part of the articular cartilage the meshwork is horizontal; in the middle zone more irregular; and in the deeper zone the meshes lie vertically.

My theory, which I believe is now put forward for the first time, is that the articular cartilage receives its nourishment from plasma that percolates along the meshwork formed by this more mucinous part of the cartilage matrix which surrounds the cell groups, and the pathological changes seen in the infective and toxic group including the "senile," strongly suggest that the toxic substances percolate along these same nutrient paths.

Repair in Articular Cartilage.

The phenomena of repair in articular cartilage throw considerable light upon osteo-arthritis, especially the traumatic type. Redfern, who performed a large number of experiments upon animals to investigate the mode of repair in articular cartilage, concluded that incisions experimentally made remained open for *long periods*, and that when repair took place eventually the bond of union was formed of connective tissue derived from the cartilage cells at the margin of the incision. There was no actual formation of new cartilage cells. He also found that incisions in the lateral portions of the

articular cartilage healed sooner than those in the central parts. I have repeated certain of Redfern's experiments, and also performed others which appear not only to confirm the views concerning the nutrition of articular cartilage enunciated above, but also to afford some explanation of the osteophytic developments which are such a marked feature of osteo-arthritis.

EXPERIMENT 1.—Right knee-joint of rabbit opened from inner side. Small portion of articular cartilage with a portion of the subjacent bone chiselled off—the portion involving the inner lip of the trochlear surface of femur and portion of the internal femoral condyle. The subsequent changes in this traumatic loose body I have described elsewhere. The animal was killed 22 weeks later, and the articular surface of the femur whence the small fragment had been detached was seen to be smoothly healed over and covered by a white and glistening substance. Microscopical examination revealed the following: The reparative tissue consists of well-formed cartilage covered superficially by a clearly-defined layer of connective tissue. Some of this cartilage is probably of the nature of cartilaginous callus, and appears to be derived from the connective-tissue cells of the cancellous spaces exposed by the trauma. The more superficial cartilage cells are formed from the connective tissue on the surface, but it is quite clear that much of the cartilage is derived from the deeper layer of the articular cartilage, which can be seen actively proliferating.

This experiment demonstrates that *the lateral part of the articular cartilage is capable of a certain amount of repair by formation of new cartilage* and this phenomenon can be explained on anatomical and physiological grounds, for we have already shown how the lateral part of the articular cartilage receives far better nourishment in the central parts, and, moreover, is furnished with a perichondrium.

EXPERIMENT 7.—Right knee-joint of a rabbit opened and the articular cartilage of the trochlear surface of femur longitudinally divided (*a*) in the centre, (*b*) near lateral edge. One month later the rabbit was killed and the portion of the trochlear surface examined microscopically. There is little, if any, proliferation at the sides of the central incision, but on either side of the lateral incision is a well-marked proliferation of cartilage cells. This experiment again demonstrates the greater vitality of the lateral portions of articular cartilage.

EXPERIMENT 5. Experimental production of traumatic osteo-arthritis.—Right knee-joint of rabbit. The central part of the articular cartilage covering the trochlear surface of the femur and patellar articular surface was pared away down to the calcified zone and the joint closed. After a few days the animal exhibited no limp or any sign of disability. Six weeks later it was killed. Microscopical examination of a transverse section of the trochlear surface is of considerable interest. There is no sign of repair of the pared surface—indeed, it has undergone necrosis. The contrast between the necrotic central parts and the lateral portion which extends for some distance over the central portion is very marked. The most interesting feature is that the cartilage of the lateral part *is in process of active proliferation*. The explanation of this occurrence undoubtedly is that the central part, owing to its poorer nutrition, is incapable of repair, and that proliferation of the lateral part must be regarded as compensatory.

EXPERIMENT 19. Traumatic osteo-arthritis experimentally produced by the action of radium. Rabbit K.—Tube containing 0·150 mgm. radium kindly lent to me by Prof. Lazarus-Barlow, was fixed against the inner border of the internal condyle near its junction with the trochlea. Four weeks later the articular cartilage at this spot is seen to have undergone well-marked proliferation, and below and internal to this zone is an area of degeneration. This experiment shows, moreover, the important influence that the vascularity of the tissues bears upon the action of radium.

The Effects of Lack of Cartilaginous Apposition and of Prolonged Cartilaginous Apposition upon Articular Cartilage.

EXPERIMENT 13.—The knee of a rabbit was fully flexed and immobilised by a staple driven on either side into the lower end of femur and upper end of tibia—the joint not being opened. A plaster bandage was applied to complete immobilisation. Rabbit killed six weeks later and post-mortem performed. The staples had become loose and there was a considerable amount of new periosteal bone formed in the vicinity of holes in femur and tibia. No intra-articular adhesions between the cartilaginous surfaces were present, and the latter were everywhere normal, save over the trochlear surface of the femur, which, owing to full flexion of the joint, had not been in contact with a cartilaginous surface. Here the cartilage had disappeared. Full extension was prevented by scarring of the joint capsule.

EXPERIMENT 11.—The patella was completely dislocated to outer side of joint. After death 10 weeks later the articular cartilage of the patella and trochlear surface had almost entirely disappeared evidently owing to lack of cartilaginous apposition. Articular cartilage elsewhere normal. No compensatory formations had as yet occurred at the margin.

These and similar experiments have an important bearing upon the pathology of osteo-arthritis, as they show that although, in all probability, mere immobility of a joint, provided it be healthy and that cartilaginous surfaces be in apposition, causes no degenerative changes in the latter, yet lack of cartilaginous apposition usually causes the articular cartilage to undergo transformation into a connective tissue. Redfern found that the articular cartilage also underwent this change after experimental amputations through joints. It is clear that this change may occur in the human subject after amputation.

Physiological Effects of Trauma upon Articular Cartilages.

Experiments were performed, of which the following is an example, to ascertain whether an isolated series of traumata was in itself sufficient to produce changes in the articular cartilages.

EXPERIMENT 12.—Rabbit was anæsthetised, the knee flexed to bring the patella in contact with the trochlear surface of the femur, and the joint covered with a cloth; a series of rapid blows were applied to the patella with a hammer so that both it and the femur were subjected to repeated percussion for about two minutes. Five weeks later the rabbit was killed and the articular surfaces were found to be perfectly normal and free from fibrillation.

This experiment should be compared with experiment 16, described later, where a suspension of *Streptococcus salivarius*, isolated from a case of pyorrhœa, was injected after percussion of a joint.

PATHOLOGY.

A. *Changes in the Articular Cartilage.*

(*a*) *Central Part of the Articulating Area.*—Although not quite the earliest observable change, the most striking early departure from the normal consists in the well-known "fibrillation" (see Fig. 5) of the central area of the articular cartilage. The poorer nutrition of the central area already referred to appears to be at least as important a factor in its earlier involvement as the greater pressure to which it is normally subjected. In the knee-joint the articular surface of the patella and trochlear surface of the femur are, in my experience, almost invariably first affected. The term "fibrillation" is somewhat misleading, as I am unable to agree that the change consists in the formation of true connective tissue fibres, but find that in the cases examined by me there is a splitting of the matrix without fibrous metaplasia. Careful examination in early cases will often reveal that the first fibrils formed lie horizontally, and in their length occasionally far exceed the normal thickness of articular cartilage. The staining by muci-carmine of normal cartilage reveals the reason for this disposition, since the more collaginous portions of the matrix lie superficially in horizontal strata, but are vertically disposed in the deeper portion. When vertically fractured articular cartilage shows the same vertical striæ, and my theory is that the fibrillation in osteo-arthritis is due to the persistence of the strata of more collaginous matrix. In certain cases I have observed cystic degeneration of the articular cartilage.

Epi-articular Ecchondroses.—Not infrequently the surface of the articular cartilage is rendered irregular by smooth rounded elevations due to the invasion of the deeper layers of the cartilage by vascular inroads of osteoblasts actively forming new bone, the cartilage cells simultaneously proliferating. Prof. Shattock named these nodular formations "epi-articular ecchondroses" to distinguish them from the "peri-articular

ecchondroses" at the articular edges. As the changes progress, the cartilage gradually disappears from the central articular area revealing the subjacent bone—the changes in which will be shortly described below.

(*b*) *Lateral Part of the Articulating Area.*—The important differences not only in structure but in mode of nutrition between the lateral and central portions to which we have already referred, explain the marked difference in the reaction of these parts

FIG. 6.

Advanced osteo-arthritic changes in knee-joint.

to the cause of osteo-arthritis. The well-known "lipping" of the articular margins, in my experience, always succeeds the degenerative changes in the central areas. It is clear that the newly formed cartilage is largely formed by the synovial perichondrium, since, when traced from the surface towards the deeper parts, all the gradations from the connective tissue cells of this perichondrium to fully formed cartilage cells may be seen. The theory of Cornil and Ranvier, which figures so largely in text-books, that the perichondrium merely prevents the proliferating cartilage cells from escaping into the joint, is not confirmed by my observations.

CASE 24.—Some of the principal microscopic features of a chondro-osteophyte are exemplified by the following description of these formations at two different spots from the knee-joint of Case 24 (personal series).

(*a*) Section (not figured) through a portion of the posterior aspect of the internal femoral condyle, including a small recurved osteophyte. The bone is of open texture containing fatty marrow covered with cartilage, in the deeper part of which there is an irregular violet zone of calcification. Near this zone there are a certain number of protrusions of cellular connective tissue, some of which also occur into the cartilage of the osteophyte itself, and others towards the articulating area of the cartilage (early epi-articular formations.) The osteogenetic processes of connective tissue are richly provided with cells, and in the case of one its continuity with the bone-marrow through a constricted neck was readily traceable; the marrow immediately beyond the neck on the side of the shaft is well-formed adipose tissue, and in the neck itself the connective tissue is being converted into fat. The general articular cartilage shows a certain amount of horizontal fibrillation at the free surface and a little proliferation of cartilage cells.

(*b*) Another portion of articular surface, including the lipped margin, reveals the same general appearances as in the last described. However, at one spot near the base of the osteophyte there is on the deep side of the articular cartilage a triangular focus of vascular connective tissue. The tissue is lax in character, well furnished with nuclei, and merges at its base into the super-adjacent cartilage, *from which it is clearly derived by a process of metaplasia.* Sections of synovial membrane from immediate vicinity of articular edge show perfectly normal structure, with no sclerosis or thrombosis of capillaries or arterioles. The villi are abnormally voluminous, the investing cells intact and devoid of any small-celled infiltration, either polymorphonuclear or lymphocytic. The vessels in the subsynovial fat are quite normal in structure and patulous.

Although the above is the usual mode of formation of a chondro-osteophyte, occasionally a development of cartilage in a synovial fold may become superimposed upon the lateral portion of the articular cartilage with which it fuses. In rare cases the articular cartilage may be buried beneath a layer of newly formed bone formed in this manner. Although at first formed of cartilage only, the chondrophyte is invaded by osteoblasts, so that the cartilage is reduced to a thin layer on the surface. This eventually undergoes similar degenerative changes and may disappear, and the subjacent bone become eburnated, showing that the formations actually in many cases extend the articular surface, and are to a certain extent compensatory formations. In some cases the under surface of an osteophyte presents supporting buttresses resembling those in the roof of a Gothic cathedral. The part played by these buttresses is clear when we remember that the cancellous spaces of an osteophyte are of extremely open and rarefied texture, and the contents largely adipose tissue. Beyond the articulating surface of a chondro-osteophyte the new formation is usually recurved, so that at first the movements of the joint remain comparatively unimpaired. Impairment of movement by osteophytes is often due to the fact that the joint has not been regularly put through its full range of movement.

Purposive Chondro-osteophytic Formations.—In very many cases, although the production of osteophytes is excessive, and may interfere with movement, or cause pain by pressure upon adjacent structures, we are often able to see evidence of definite purpose underlying these formations. The response of the central area of the articular cartilage to the cause of osteo-arthritis is by degeneration, whereas the better nourished lateral part proliferates. The latter may be regarded as Nature's effort to make good the loss of the central portions. An excellent example of this is seen in the changes that the femoral head undergoes. The successive changes are exemplified by three different specimens from Guy's Hospital Pathological Museum. The first shows the head of the femur surrounded to an equal extent on all sides by an osteophytic outgrowth; the second shows the upper part of the head flattened from pressure atrophy, the lower part of the osteophytic ring having undergone compensatory enlargement; and in the third specimen the lower part of the osteophytic development now forms a smooth articulating surface continuous with the remnant of the femoral head. The actual angle formed by the neck with the shaft remains unaltered.

Chondro-osteophytes in Rheumatoid Arthritis.—Although we occasionally see cases presenting anomalous features and association of the two conditions, yet typical cases of osteo-arthritis and rheumatoid arthritis present definite clinical and pathological features. The typical case of rheumatoid arthritis presents the picture of a subacute, non-suppurative arthritis similar to certain forms of arthritis of known infective origin, such as gonorrhœal. The first and most marked inflammatory changes occur in the

synovial membrane and capsular structures, giving rise to the typical "spindle-shaped" swelling of the joint. A very important distinguishing factor lies in the fact that rheumatoid arthritis is associated with a far greater amount of protective muscular spasm; this leads to limitation of joint movement, and as a result there is nothing to prevent the pannus of granulative tissue from the synovial membrane extending over the surface of the articular cartilage, and often leading to the disappearance of the latter. The ultimate result is therefore in most cases ankylosis between joint surfaces which may be partial, complete, fibrous, cartilaginous, or bony. In certain cases where ankylosis has been prevented I have observed the formation of true compensatory chondro-osteophytes at those situations where the lateral portion of the articular cartilage has not been destroyed by the synovial pannus. These may exactly resemble those occurring in osteo-arthritis, and, indeed, it may be said that osteo-arthritis has supervened upon rheumatoid arthritis.

Changes in the Original Bone in Osteo-arthritis (Fig. 6).—If vertical sections be made through the articular end at different stages, I have observed that before the subarticular lamella of bone is actually exposed it has already begun to undergo sclerosis; the increased thickness of this bony layer beneath a patch of degenerate cartilage may be very striking. This remarkable change is evidently compensatory, since the bone is deprived of its normal protection. The invasion of the peri- and epi-articular ecchondroses by outgrowths from the bone has been referred to above. The eburnation that occurs in the late stages is well shown in the figure.

CASE 27.—A section through the patella shows the most peripheral part of the cartilage still of normal thickness, and the artificial "flaking" due to the detachment of the flat-celled layer at the surface—*the cells being still living.* More centrally there is a second vertical splitting in the cartilage; the cell nuclei retain their stain and there is no obvious formation of fibre. Still more centrally the cartilage becomes thinner, the cells remaining healthy, till it disappears after breaking up into irregular fragments. The exposed articulating area here consists of very dense bone obviously due to sclerosis of the normal cancellous tissue. For a short way the osseous trabeculæ continued from the sclerotic layer are thickened. At one spot immediately below the sclerotic zone there is a microscopic island of hyaline cartilage, having in its centre a small pseudo-cyst resulting from liquefaction—the matrix containing here no cell nuclei. Where the cartilage is wanting, or its remnants quite detached, the sclerotic bone beneath presents a certain number of areas extending from the calcified zone, and distinguished from the proper osseous substance by their staining of a faint violet colour and being quite homogeneous in structure—the proper bone being stained red with the eosin. This homogeneous material in certain spots is intimately mixed with the laminated structure of the bone, suggesting that it has arisen by a process of degeneration occurring in the latter. The cells in the degenerate areas are unstained or stained very faintly. Here and there the more superficial parts of the degenerate tissue contains groups of cells apparently cartilaginous. Slightly below one of the extensions of degenerate tissue is the small nodule of cartilage already described.

If this small cartilaginous focus be examined under a higher power the degenerate and more faintly staining osseous tissue may be seen above and to the right, and it is clear that the cartilage cells have arisen by a process of metaplasia from the bone corpuscles, and that in a similar manner the cartilaginous matrix has arisen from the bony matrix. The cause of the degeneration still continuing to act, the cartilage itself is undergoing degeneration in the centre. The presence of cysts in the articular cartilage has already been noted; the synovial chondromata may also undergo cystic degeneration. We thus see that there are at least three topographical varieties of cyst in osteo-arthritis. There is no evidence at present that cysts of the semilunar cartilages may own the same pathogenesis.

Changes in the Synovial Membrane.

In a very large proportion of cases the first naked-eye appearance of the disease occurs in the central area of the articular cartilage, and the synovial membrane very rarely shows any obvious changes until the first sign of "lipping" appears, when thickening of the membrane at these spots and enlargement of existing—with formation of new—villous processes will be found. These changes may be quite localised in the early stages. When examined during life at operation the affected portion of the synovial membrane appears unduly vascular. Microscopical examination of the membrane in all save the very advanced cases shows general hyperplasia affecting all its elements, the membrane and the newly formed villi being well supplied with blood-vessels, and the arterioles and capillaries perfectly patent, with no signs of arterio-sclerosis. Specimens injected with carmine and gelatin demonstrate well that the membrane is not in a state of diminished vascularity.

In certain cases, as is well known, the enlarged villi become the seats of a formation of adipose tissue (lipoma arborescens of Müller). A further remarkable change is the formation of nodules of cartilage in the synovial villi. I have discussed these interesting tumours elsewhere, and have named them "synovial chondromata." In the later stages of osteo-arthritis the hypertrophied synovial villi undergo secondary changes and the membrane becomes comparatively smooth and atrophic. In this late stage arterio-sclerotic changes may sometimes be observed in the vessels of the capsule and membrane. These have been noted in one case by Hoffa and Wollenberg and more recently by Strangeways.† Since, however, these vascular changes, if they occur at all, occur late in the disease, it is difficult to see how they can, as these observers state, constitute an ætiological factor.

In a later stage a section from near the edge of the trochlear surface shows fibrotic elongation of the fringes, the tissue almost as far as the endothelium being dense and somewhat homogeneous. Most of the capillaries are patent in the fibrotic areas, although the fibre immediately around them is arranged somewhat conformably with the lumen. In other fringes the concentric arrangement of fibres around the capillaries obtains without any surrounding fibrosis. Professor Shattock suggests that this striking development of fibres round the capillaries might well be termed "peri-capillaritis diffusa." None of the fringes contains any fat. In a few spots the capillary is blocked by an associated proliferation of endothelium. The gross changes in the capsule and intra-articular structures are too well known to require separate consideration.

Suppuration, as was originally pointed out by Sir Benjamin Brodie, is a very rare complication of osteo-arthritis. A probable explanation of this fact will be adduced in the final portion of the Report.

(*To be concluded.*)

† Observations on the Nutrition of Articular Cartilage, Brit. Med. Jour., 1920, May 15th.

SOCIETY FOR THE STUDY OF INEBRIETY.—The next meeting of this society will be held in the rooms of the Medical Society of London, 11, Chandos-street, Cavendish-square, London, W., on July 11th, at 4 P.M. Mr. Charles J. Bond, the President of the society, will deliver an address on the Influence of Hospitals on Temperance Reform.

DONATIONS AND BEQUESTS.—The late Miss Alice Charlotte de Rothschild, of Waddesdon Manor, Buckinghamshire, left, among other bequests, £2500 to the Buckinghamshire County Hospital, Aylesbury.—By the will of the late Rev. George Edward Aspinall, of Halls Ings, Southowram, Yorks, the Royal Halifax Infirmary will receive £1000.—The late Mr. Henry H. Wills, of Bristol, who left estate valued provisionally at £2,750,000, established by will a trust fund for the benefit of Mrs. Wills for life, which is charged at her death with certain charitable and other bequests. The residue of this fund and all the testator's residuary estate will be divided into 200 shares, according to which the West of England Sanatorium, Dr. Barnardo's Homes, and the Church of England Waifs and Strays Society will each receive £5000; the National Society for Prevention of Cruelty to Children, £3000; the Society for Prevention of Cruelty to Animals, £1500; and the School for Deaf and Dumb Children, Margate, and the Edith Cavell Homes of Rest for Nurses, £1000.—The Chelsea Hospital for Women has received from an anonymous donor ("In Loving Memory") £50, and £50 for the Convalescent Home. The £36 final instalment of the bequest of the late Mrs. Stephenson has also been received.

THE ÆTIOLOGY OF RICKETS IN INFANTS:

PROPHYLACTIC AND CURATIVE OBSERVATIONS AT THE VIENNA UNIVERSITY KINDERKLINIK.*

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THE following observations upon the ætiology of rickets form a summary of work carried out in Vienna during the last 18 months. The results throw light upon the subject, and, as the fully documented report will necessarily take several months to prepare, it has been thought advisable to publish a brief account in the meantime, showing the lines of inquiry, the results obtained, and the conclusions drawn. The inquiry was undertaken in the hope of obtaining a solution to the problem whether rickets in infants is to be attributed to faulty diet or to other unfavourable circumstances in the environment, and whether, in the former case, a relation could be established between incidence of the disease and a deficiency of a specific food constituent—viz., vitamin A. Vienna offered special advantages for work of this nature. Rickets was widespread and severe in the city, and many opportunities for study of the disease were available.

It is clear that effective clinical investigations dealing with the relation of diet to incidence of rickets can only be carried out under conditions in which strict control of diets, both quantitative and qualitative, can be exercised. The University Kinderklinik, under the direction of Professor Pirquet, provided special facilities for quantitative work. For some years the research work carried on in this institution has been largely devoted to the subject of nutrition in childhood, and in the development of Prof. Pirquet's Nem system, methods of allotting, controlling, and recording diets have been specially elaborated. The staff has received a degree of training and experience in the technical details of nutritional work which is probably without parallel elsewhere.†

Another consideration pointed to Vienna as particularly suitable for this inquiry. The diet in common use for infants in the klinik was of an unusual type, presenting special points of interest for a study upon prophylaxis of rickets. This diet, referred to below as Diet I., was originally devised by Prof. Pirquet and his staff as an expedient for a time of milk and fat shortage. It was of high caloric value, and contained from two-thirds to one-half its total energy value in the form of sugar. Such a diet, however, if continued over a long period, being high in carbohydrate, and relatively low in milk, milk fat, and vitamin A, might be regarded as disposing to rickets in the light of the various dietetic theories of the ætiology of the disease which have been advanced. In the Kinderklinik the disease had been known to develop in infants receiving this diet, but it was then considered by Pirquet and his colleagues that rickets was probably infective in origin, and that the diet was not implicated.

Prof. Pirquet offered full coöperation in an inquiry into the influence of diet on the prophylaxis and treatment of rickets, and made available 60 cots in the wards of the Kinderklinik and at the Am Tivoli Hospital, Meidling. This institution, also under Prof. Pirquet's direction, is staffed from the Kinderklinik, and the same system of general management and diet control is maintained. The wards at Meidling may therefore be regarded as an extension of those at the Kinderklinik. The medical direction at the Kinderklinik was undertaken by Assistent Dr. Hans Wimberger, and at Meidling by the physician-in-charge, Dozent Dr. Egon Rach.

The following observations on prophylaxis and cure of rickets may be summarised as a study of (1) influence of diet under constant conditions of general hygiene; (2) influence of one factor in general hygiene—viz., light, under constant conditions of diet.

Observations on Prophylaxis.

Types of Diet.—For the observations on prophylaxis two diets of contrasting type were in use in the same wards, under identical conditions of general hygiene and management. The surroundings of the infants were as nearly perfect as possible, the conditions being those of a first-class modern hospital, and the allowance of trained personnel about one to every two cots. The wards were large and well lighted, with a minimum air allowance per infant of 900 cubic feet. On admission babies were placed in two groups upon Diets I. and II. respectively, care being taken that the two groups of children should be as similar as possible in age and general development.

GROUP I.—Diet I. (commonly in use for infants at the Klinik) consisted of Vienna fresh milk undiluted, with the addition of 8–10 per cent. sugar; in certain cases the sugar addition was from 17–18 per cent. The milk was from stall-fed cows and of low vitamin-A value when tested; the cow's fodder in winter consisted of chaff, cereals, straw, and roots. Diet I. included cereals after the age of 5 months, and later additions of fresh fruit and vegetables. The caloric allowance of this diet was accurately adjusted in accordance with the Nem system.

GROUP II.—Diet II. consisted of a standardised full-cream dried milk prepared to yield a fluid containing 13 per cent. solids; protein 3·4 per cent., fat 3·4 per cent., sugar 5·3 per cent. For infants under 3 months it was usually necessary to employ a greater dilution and to add a small amount of sugar. Additions of cereals were made for older infants. The infants in this group received up to 8 g. daily of cod-liver oil.

In both groups, with a few exceptions made for special reasons, a daily allowance of 5–10 c.cm. of raw lemon juice, swede juice, or tomato juice was given as anti-scorbutic. There was no significant difference in vitamin-A value of the milk used in Diets I. and II. respectively.

The distribution of calories in Diets I. and II. in protein, fat, and carbohydrate was roughly as follows:

	Calories as—		
	Prot. %	Fat %	Carbo. %
Diet I. ..	11	24	65
Diet II. ..	20	45	35
Human milk ..	12	50	39*
Cows' ,, ..	20	49	30*

* Schall and Heisler.

It proved necessary to give a larger caloric allowance in Group I. than in Group II. in order to maintain normal growth. There was therefore less difference in the amount of milk taken than would

* Preliminary report to the Accessory Food Factors Committee appointed jointly by the Lister Institute and the Medical Research Council.

† For a complete account of the Nem system and the scientific basis upon which it is founded reference must be made to the works of Prof. Pirquet and his colleagues (System der Ernährung, 4 vols., Springer, Berlin, 1917–1919). The salient points, in so far as the present investigation is concerned, may be summarised as follows. The caloric needs of each child are calculated upon the basis of the sitting height as a standard measurement, regard being also taken to the age, degree of activity, and general progress. All food is prepared to be of standard composition and of standard caloric value, the food unit being the "Nem" or food value of 1 c.cm. of a standard human milk containing 1·7 per cent. protein, 3·7 per cent. fat, and 6·7 per cent. sugar, or cows' milk containing 3·4 per cent. protein, 3·7 per cent. fat, and 5 per cent. milk sugar. The fat content of the milk supplied is estimated daily, and, if necessary, the caloric value of the milk is adjusted by additions of sugar or of water. The careful quantitative work in the kitchen is supplemented by an elaborate system of record keeping in the ward. The amounts allotted for each infant are accurately measured, and if the child fails to take the prescribed amount the unconsumed residue is measured, so that for each meal the actual intake of food is recorded. The body-weight and temperature are registered daily, and a record is kept of appetite, activity, and clinical condition. Twice monthly a complete series of body measurements is made.

otherwise have been the case. The infants in Group I. received about 20 per cent. less milk than those in Group II., and nearly twice the amount of sugar. The balance of protein, fat, and carbohydrate in the two groups was totally different. In Diet I. more than 50 per cent. of the total calories were given in the form of sugar, 10–15 per cent. as protein, and 20–30 per cent. as fat; in Diet II. sugar accounted for 30 per cent., protein for about 20 per cent., and fat for 50 per cent. of the total.

The cod-liver oil given over the greater part of the time was a sample of unrefined Norwegian oil, of strong taste, and dark in colour. A sample of the oil was tested by Dr. S. S. Zilva at the Lister Institute and found to be rich in content of vitamin A, being active in one-ninth of a drop (2 mg.), as tested in growth experiments upon rats. It was given in the form of a 50 per cent. emulsion made with caragheen and sugar, and was well tolerated by the infants in the doses given. The vitamin-A content of the milks used in winter in Groups I. and II. respectively was also controlled by experiments with rats, and showed consistently low value.

Type of Cases and Methods of Diagnosis.—Sixty-four cases were under observation in the prophylactic series for periods of 5 to 15 months. The age on admission varied from 1 week to 5 months, and in 57 cases was under 3½ months. It was necessary to admit infants at this early age as evidence of rickets was so often present in those of 4 months old and upwards. All children included in the series showed no evidence of rickets on X ray examination at the time of admission, and were also as far as possible free from clinical stigmata of the disease and in good general condition, but many were young illegitimate babies already receiving artificial food and clinically below normal. After admission radiographic examination of the epiphyses was repeated at frequent intervals. Clinical examinations of each infant were made fortnightly, and records kept of ossification of the skull, size of fontanelle, enlargement of costo-chondral junctions, shape of the chest, size of epiphyses, enlargement of spleen, and general nutrition and development. Clinical diagnosis of rickets was based on the bone stigmata. Most important of these for early recognition of the disease in infancy were craniotabes and marked enlargement of the costo-chondral junctions; in some cases craniotabes was the earliest sign, in others rapid development of beading. Cranial bossing, enlargement of epiphyses at wrist and ankle, and bending of the long bones proved of less value for early diagnosis.

For classification of results the X ray diagnosis has been taken as the criterion of the presence or absence of rickets and as an indication of the stage of the disease, whether active, healing, or healed. In this way a uniform standard of diagnosis is established, based on the condition of the bones without reference to the clinical signs of rickets. It is not suggested that bone lesions are the only signs of the disease, but consideration of other evidence of rickets is deferred for later discussion.

On the whole, clinical and X ray diagnoses of rickets showed a close parallel, and the X ray standard was adopted because the radiographic plate provided the clearest and least subjective evidence and demonstrated the disease at an early stage. Clinical signs, especially craniotabes, were sometimes present before rickets could be diagnosed radiographically, and some cases were repeatedly normal in the X ray plate whilst showing clinical indications of rickets. These occurred during summer and winter, and on both types of diet, and in one such case the diagnosis of rickets was confirmed at a post-mortem examination. It follows that by adopting an X ray standard of diagnosis some slight and transient cases may be classed as non-rachitic, but this does not affect the general conclusions later set forth. These conclusions are based upon the development of a much more lasting and unmistakable degree of normality or abnormality in the bones.

TABLE I.—*Observations on Prophylaxis: Influence of Season, Diet, and Age.*

Total number of infants observed = 64 (26 cases appearing in Group B and 1 case in Group C appear also in Group A). Length of observation = 5 months. Rk. = Rickets diagnosed by X ray examination.

Group	Age of infants (months). Beginning of period.	End of period.	Total.	No. of infants. Receiving the different diets.	RK.
Summer Period: April–June to September–November.					
A	1 to 5	6 to 10	40	Diet I. .. 15	0
				Diet I. + C.L.O. 3	0
				Diet II. .. 22*	0
Winter Period: October–December to March–May.					
B	6 to 10	11 to 15	27	Diet I. .. 11	3
				Diet I. + C.L.O. 3	0
				Diet II. .. 13	0
C	½ to 4	5 to 9	24	Diet I. .. 13	11
				Diet II. .. 11†	0
Total			51	51	14

C.L.O. = Cod-liver oil. * Including one breast-fed infant.
† Including one partly breast-fed infant.

TABLE II.—*Winter Season: Additional Details of Positive Cases in Table I. (B and C) Diet I.*

Cases.	Sex.	Birth month.	Admission month.	Date X ray diag. of rickets.	Age rickets diag. (months).	Craniotabes. Date first diag.
Diet I.—B (three positive cases).						
J. M.	M.	Mch.	May	Apr. 21*	13	–
C. P.	M.	Apr.	,,	Jan. 4	8½	+Feb. 22
O. W.	M.	,,	,,	Feb. 24	10	–
C (all cases).						
E. R.	F.	July	Oct.	Feb. 1	6	+Feb. 23
M. H.	F.	Aug.	Nov.	Dec. 30	5	+Feb. 9
F. K.	M.	,,	Oct.	Feb. 27	6½	+Mar. 9
H. G.	F.	,,	Dec.	May 2	8	+Feb. 23
M. D.	F.	,,	Oct.	Mar. 13	6½	+Feb. 9
W. K.	M.	,,	,,	Feb. 28	6	+Mar. 8
L. H.	M.	,,	Nov.	Feb. 13	5½	+Jan. 26
E. D.	M.	Sept.	Oct.	Doubtful		–
M. Z.	F.	,,	,,	Mar. 13	6	+Mar. 9
H. U.	F.	Oct.	Nov.	Mar. 31*	5½	–
M. M.	F.	Nov.	,,	Mar. 29	5	–
N. B.	F.	,,	Dec.	Negative		–
M. B.	F.	Dec.	,,	Apr. 10	4	+Apr. 5

+ = Positive. – = Negative.
* Already showing signs of healing.

The results of the prophylactic observations as determined radiographically are set out in Table I. to show the influence of (1) season, (2) diet, and (3) age upon the incidence of rickets. During the summer *no* case of rickets was detected among a total of 40 infants on both types of diet. In the winter series of 51 cases under observation, 14 developed rickets in the spring. These positive cases *all* occurred among the 24 infants upon Diet I., and principally among the younger infants in Age Group C. This group contained 13 infants born between July and December, of whom 11 developed rickets by the beginning of April at ages varying from 4 to 8 months. It is clear, therefore, that the first six months of life is a period of great susceptibility.

Clinical Notes.

The general condition of the infants who developed rickets showed much variation, and during the onset of the disease had no constant relation to the appearance of early rachitic changes. Some infants maintained good condition throughout the observation and approximated to the normal rate of growth and development concurrently with the appearance of rickets in the bones, but the majority were below normal with some degree of inactivity, flaccidity, pallor, or retardation of growth. The relation between the clinical evidence and the X ray diagnosis of rickets is of great practical importance. All the positive cases in Table I, showed also clinical signs of rickets, the appearance of which coincided on the whole with the date of the X ray diagnosis, though there were usually clinical indications of the disease at an earlier period. Conversely the majority of cases normal radiographically were clinically non-rachitic.

Craniotabes occurred in 10 of the 14 cases radiographically positive (Table II.), but was also found in three other cases in which no diagnosis of rickets was made by X ray examination. The possibility of the confusion of craniotabes and congenital softness of the cranial bones was borne in mind, and the former condition was only diagnosed when softening supervened in areas previously ossified. Craniotabes sometimes appeared before X ray diagnosis of rickets could be made, and after treatment began disappeared more rapidly than any other clinical sign. From the close association of this condition with radiographic evidence of rickets and its rapid response to anti-rachitic treatment, it is reasonable to conclude that craniotabes is a sign of active rickets.

Rapid and marked enlargement of the costo-chondral junctions was noted in most of the cases of rickets diagnosed by X ray examination. Some enlargement occurred in all cases admitted, but only in those babies with other definite evidence of rickets was considerable increase noted. A series of histological examinations undertaken in the course of this investigation by Dr. A. Feller at the Pathologisches Institut has shown that minor degrees of enlargement, though often pathological, are not necessarily rachitic, but that marked grades are diagnostic of rickets when scurvy can be excluded. Deformity of the chest often accompanied other early signs of rickets and was easily aggravated by mild respiratory affection or by abdominal distension.

No definite case of tetany was diagnosed, although the condition was suspected in several instances. Abdominal distension was not often present in the infants under observation, and in only two cases diagnosed as rickets by X ray was the condition persistent. The spleen was sometimes palpable in the case of chest deformity or abdominal distension, but there was no evidence that early rickets was associated with splenic enlargement. Cranial bossing was present in one of the positive cases in Table I. and was doubtful in others. It was a useful sign when definite, but in the earliest stages of the disease was often doubtful or absent. It was noted in a few cases radiographically normal. Epiphyseal enlargement at the ends of the long bones presented difficulty in diagnosis as the normal limits of size are considerable and a normal increase often occurs after 8 months of age. Nevertheless slight epiphyseal enlargement in conjunction with other signs of the disease had diagnostic value. Only one of the 12 cases positive in X ray showed marked increase in size of wrists and ankles, but slight enlargement was observed in the majority of the others.

The results of this prophylactic series of cases show conclusively (1) that rickets has a marked winter incidence; (2) that protection in winter can be afforded by diet; and (3) that infants are very susceptible to the disease in the first six months of life.

Observations on Therapy.

The observations were made upon 14 infants who developed rickets in hospital while receiving Diet I., and upon 18 more severe cases admitted between January and April. One child was 2 years of age, and all others were from 4 to 18 months old when treatment began. Three methods of treatment were studied: (1) Treatment with cod-liver oil; (2) exposure to mercury vapour quartz lamp; (3) outdoor treatment in sun or shade. Children in groups (1) and (2), together with the untreated control cases, remained indoors during the period of observation. Except for the 2-year-old child, the diet of all cases was Diet I. (see above), the ordinary infants' diet of the Kinderklinik. The vitamin-A content of the milk used showed no increase during the period of observation. The infants who developed rickets while in hospital had, therefore, no change of diet when treatment was instituted. The allowance of milk was comparable for all infants, who were maintained under the same external conditions except in so far as their respective treatments involved a different arrangement. In the case of infants admitted with rickets, control observations were supplied either by a preliminary period of observation before treatment was begun, or by comparison with other untreated cases admitted in a similar condition. Admissions were so arranged that some such control cases were present in the ward during the whole period of observation from January to May. The observations upon infants who had developed rickets in hospital were controlled by the previous history of the individual child and by comparison with untreated cases in the same group.

(1) *Cod-liver Oil, 6 Cases.*—Cod-liver oil was given as 50 per cent. emulsion of unrefined oil. The daily dose was from 5–10 g., mixed with milk and given in the bottle. The initial dose was 1–2 g., and the amount was increased as quickly as possible until the full dose was reached in about 10 days. Healing processes were demonstrated radiographically in two to four weeks from the beginning of treatment, in the form of calcium deposition in the unossified tissue at the ends of the long bones. The bone picture was gradually restored to the normal in a period which depended on the severity of the condition when treatment was begun.

(2) *Exposure to Mercury Vapour Quartz Lamp, 7 Cases.*—The lamp employed was of the Hanau pattern as used ordinarily in the Klinik for dermatological therapy. Treatment was given three to four times weekly, beginning with five minutes' exposure at a distance of 80 to 100 centimetres, the time being gradually increased to 30 minutes and the distance reduced to 60 centimetres. The full dosage was attained in two to four weeks, the time varying with the age and condition of the child. The result was the same whether one limb, one side, or the whole body was exposed. Slight pigmentation followed long courses of treatment, but no other effects were observed on the skin. The results obtained were indistinguishable radiographically from those obtained with cod liver oil. Healing of rickets was apparent in from two to four weeks after a total exposure of from two to five hours.

(3) *Outdoor Treatment, 12 Cases.*—The first therapeutic exposure to sunlight was made early in March, 1922, and thereafter cases were exposed for varying periods according to weather conditions, many being out of doors for the whole day. The amount of clothing varied with wind and temperature, and was reduced until the whole body was exposed when the weather was favourable. Careful records were kept of the time of exposure in sun or shade and of the clothing worn. Seven cases were exposed to direct sunlight, three receiving maximum amounts from March onwards; two were shaded from direct rays of the sun; three others treated with sunlight had also additions of cod-liver oil in their diet. The rate of bone healing was most rapid in the last group, and in the others was roughly proportional to the amount of exposure. Each method of treatment was equally effective in restoring normal bone conditions, but this process sometimes took place independently of any definite improvement in the general condition. Response was relatively most marked in cases receiving cod-liver oil and exposure to sunshine simultaneously, and the children treated out of doors showed more rapid general improvement than those remaining in the wards while under treatment.

Control Cases.—Young infants who developed rickets on Diet I. in February, March, and April progressed unless treated, but in May tended to show slow recovery. During February, March, and April only one control case showed definite recovery from rickets without special treatment, and this child showed sudden improvement in bone condition in March. He occupied a cot in a corner of the ward exposed to the direct rays of the sun, and the healing is attributed to this fact. The occurrence stressed the extreme difficulty of obtaining a perfect control in such observations as these, and from that time still more stringent precautions were taken for obtaining uniform conditions of light intensity.

Cases admitted with rickets, while undergoing the preliminary periods of observation on Diet I., served to establish one important fact. By transfer to hospital, conditions of air space, ventilation, cleanliness, freedom of movement, and general hygiene were markedly improved for the majority, who had previously been in very inferior surroundings. This change did not of itself, however, bring about alteration in the rachitic condition. During April and May the windows in the wards were open for long periods and the children enjoyed plenty of fresh air.

The following cases illustrate the points dealt with above :—

CASE W. K.—Born August 25th, 1921. Admitted Oct. 19th, 1921, aged 2 months. Weight 4700 g. Normally developed child in good general condition: no stigmata of rickets. Received Diet I. Nov. 24th: Progress hitherto not satisfactory owing to intestinal disturbance. X ray shows normal bones. Dec. 29th (wt. 5500 g.): Has had abscess of scalp and otorrhœa for past month, now improving. Jan. 31st (wt. 6300 g.): General condition improving steadily, activity fair, costo-chondral junctions enlarging rapidly, no deformity of chest, early enlargement of epiphyses; X ray shows normal bone structure. Feb. 28th: Rickets diagnosed radiographically. March 8th (wt. 7200 g.): Steady general progress, though stigmata of rickets more marked; small area of craniotabes, marked beading, epiphyses enlarged. March 21st (wt. 7400 g.): Rachitic stigmata increasing slightly, in spite of excellent general condition. Treatment begun by exposure to mercury-vapour quartz lamp. April 14th (wt. 8000 g.): Has had treatment on 14 days. Total exposure 4½ hours, at distance of 80 cm. General condition excellent, activity greatly improved, no craniotabes, other clinical stigmata unchanged; X ray shows rapid healing of bones. May 9th (wt. 8600 g.): Further treatment on 13 days, with total exposure of 6½ hours at 80 cm. distance. Steady progress maintained, development normal, can just sit alone; rachitic stigmata diminishing; X ray plate shows bone almost normal.

CASE E. R.—Born July 21st, 1921. Admitted Oct. 24th, 1921, aged 3 months. Weight 3400 g. Small thin child, very pale, appears underfed; activity fair; no craniotabes, no beading, no epiphyseal enlargements. Received Diet I. Dec. 8th (wt. 4200 g.): Progressing steadily, though slowly; epiphyses normal radiographically. Feb. 1st (wt. 5100 g.): Progress maintained, costo-chondral junctions enlarging; X ray shows rachitic changes at epiphyses. Feb. 22nd: Slight craniotabes present. March 10th (wt. 5800 g.): Marked beading of ribs, early deformity of chest, slight epiphyseal enlargement, craniotabes progressing. General condition fairly good, well nourished, colour fair, activity below normal. Outdoor treatment with maximum exposure to sunshine begun; no alteration in diet. March 22nd (wt. 6200 g.): First evidence of healing shown by X ray plates; in preceding 12 days had been out of doors for 88 hours, and there had been 55 hours of sunshine. April 6th (wt. 6700 g.): Very marked improvement in general health, activity much increased, skin pigmented, colour good, tissues of normal tone; X ray plates show specially rapid rate of healing in bones. April 27th (wt. 7200 g.): Rapid general progress; clinical stigmata diminishing. May 27th (wt. 8300 g.): Aged 10 months. General condition excellent, no clinical stigmata of rickets; X ray plates show completely healed rickets.

CASE M. D.—Born August 28th, 1921. Admitted Oct. 25th, 1921, aged 2 months. Weight 3800 g. Small child, pallid, fairly well nourished, activity poor, skin harsh and dry, chest short and contracted, abdomen distended; no craniotabes, no costo-chondral enlargement. Received Diet I. Progress poor and weight stationary for first month. Dec. 1st (wt. 3700 g.): General condition worse than on admission, with marked spasticity, but improvement began from this date. Jan. 10th: Steady progress, spasticity disappeared and child normally active. Rickets gradually developed during the period of uninterrupted progress. January–March: Beading of ribs increased rapidly, with deformity of chest exaggerated by persistent distension of the abdomen. Feb 9th: Craniotabes noted. March 13th: X ray picture showed definite rachitic changes in bones at wrist and ankle. Clinical condition remained good, while craniotabes and other bone changes advanced. April 21st (wt. 6200 g.): Activity and general condition satisfactory, but had convulsions. Treatment begun with calcium lactate 3 g. daily, cod-liver oil 5 g., and maximum exposure to sunlight. Response was very rapid. May 2nd: Healing was evident in the X ray photograph and progressed very rapidly. May 18th: Craniotabes completely disappeared. June 3rd (wt. 7400 g.): Aged 9 months. General condition excellent; could crawl and tried to sit alone; some abdominal distension and contraction of the thorax present, but diminishing; X ray shows marked advance in bone healing.

CASE L. J.—Born Feb. 2nd, 1921. Admitted Jan. 28th, 1922, aged 12 months. Weight 6200 g. Small for age; but well developed, vigorous, active, very good general condition, colour fair; extensive craniotabes, costo-chondral junctions markedly increased in size, epiphyses enlarged; advanced rachitic changes shown radiographically. Received Diet I., remaining indoors. Feb. 7th: Two grammes of cod-liver oil added to diet, amount increased to 10 g. by Feb. 25th, thereafter 10 g. daily. March 3rd: First stages of healing in bone shown by X ray. March 22nd: Craniotabes completely disappeared; X ray plate shows rapid healing of bones. April 19th: Diminution in clinical bone stigmata noted. May 10th (wt. 7500 g.): Aged 15 months; rachitic stigmata disappearing; active and vigorous, walks round cot; general condition as on admission, except that marked pallor is present. Clinical history uncomplicated. May 25th (wt. 8000 g.): X ray shows healing of bones almost complete.

Discussion of Results.

Many of the above observations confirm the results of previous workers. The particular features of the present investigation have been the strict control of diet and of other external conditions and use of regular radiographic examinations for accurate diagnosis of onset, development, and healing of the disease.

Conclusive evidence of prophylaxis in infants during the winter by means of diet where food and external conditions have been strictly controlled has not previously been recorded. The protective action of Diet II. is probably to be attributed to the small quantity of cod-liver oil it contained; the other main difference between Diets I. and II. was the substitution of sugar by milk, but Diet I. proved *curative* in early spring when cod-liver oil was added, and no evidence was obtained to implicate the excess of carbohydrate, and smaller allowance of fat and protein, in Diet I. as rickets-producing. It must be admitted that no special investigation was made to elucidate this point, but the common occurrence of rickets in breast-fed children in Vienna is an interesting fact in this connexion.

The observation upon seasonal incidence is in accordance with the experience of all clinicians that rickets develops in winter and spring and is healed in summer. The results of sunlight therapy confirm the clinical observations of Hess and his co-workers (1921), and support the theory put forward by these authors that "seasonal incidence of rickets is due to the seasonal variation of sunlight." The value of sunlight in prevention of rickets in rats has recently been demonstrated by Hess, Unger, and Pappenheimer (1921), and Powers, Park, Shipley, McCollum, and Simmonds (1922). The observations made by Huldschinsky in 1919 that the rays of the mercury-vapour quartz lamp had a curative effect upon rickets have since been substantiated by numerous workers, and suggest that the action of sunlight out of doors may depend on the ultra-violet rays it contains. From a world-wide review of the epidemiology of rickets Hansemann (1906) concluded that the disease could not be explained by deficiency in diet, and that lack of fresh air and free movement of the children was responsible. Findlay (1909), Paton (1918, 1921), and Ferguson (1918), have arrived at a similar conclusion, Findlay laying particular stress upon the want of exercise, and Paton including general hygienic deficiencies in the chain of causation. Their observations and experiments, together with Miss Ferguson's analysis of the occurrence of rickets in Glasgow in relation to various hygienic conditions and opportunities for exercise in the open air certainly indicate that a faulty diet, if operating at all, is not the sole factor. We have obtained no evidence that fresh air or exercise produced any effect apart from the concomitant greater incidence of sunlight, and our observations, we think, prove that, with a minimal insolation, as during winter, diet is the controlling factor.

Perhaps the most interesting result is the identical action of cod-liver oil on the one hand, and light therapy on the other, on the bone lesions of rickets. This fact, while explaining the prevalence of rickets in winter in northern climates and large cities, may at the same time account for its prevention in Greenland, if large amounts of fish oils are consumed by the mothers and older children. The scientific aspect of the problem is particularly fascinating, for if the anti-rachitic action of cod-liver oil be attributed to the vitamin A it contains or some factor with a similar distribution (Mellanby, 1918, 1919, 1921, McCollum

and his co-workers 1921, Korenchevsky 1921), the possibility is suggested of a special photo-synthesis of this vitamin in the animal body under influence of sun radiation, an idea which is quite new to animal physiology. Experiments upon animals arranged to confirm or elucidate this idea are already in progress.

It was not possible to decide whether vitamin from sources other than cod-liver oil had any effect in prevention or cure of rickets. The large amount of sunshine out of doors would suffice to explain the prophylaxis observed in summer, so that any protective action of milk, if present, would have been masked by the action of the sun. It is improbable that a high value of vitamin was reached at any time in the Vienna milk, since the cows in and near the city are often stall-fed, even in summer. It was hoped to investigate the value of milk rich in vitamin A for the *cure* of rickets in spring, but this could not be carried out as such milk could not be procured.

The results of the present study place the age of greatest susceptibility to the onset of rickets earlier than that usually accepted by clinicians. The early age, however, is in accord with that determined by Schmorl (1909) after histological examination of post-mortem cases. This conclusion stresses the importance of observing *young* infants in attempts to elucidate the ætiology of rickets, and demonstrates the difficulty of ætiological studies made upon older children in which systematic control by X ray was not employed.

SUMMARY.

The foregoing observations show :—

1. That rickets developed during winter and spring under excellent hygienic conditions in infants receiving Diet I., composed of fresh milk from stall-fed cows and to which sugar was added, and was prevented in the case of children receiving Diet II., containing cod-liver oil, more milk, and less carbohydrate. Both milks were low in vitamin A.

2. That rickets did not develop in summer on either diet.

3. That rickets can be cured by cod-liver oil and by exposure to sunlight, or to the radiation of the mercury vapour quartz lamp.

4. That the first six months of life is a period of special susceptibility to the onset of the disease.

5. That rickets may develop in an infant whose general condition is good or improving, and that healing of the bones may occur independently of improvement in the general condition.

Acknowledgments.—Thanks are due in the first instance to Prof. Pirquet, Director of the Vienna University Kinderklinik, whose hospitality in placing the wards and other resources of the Klinik at the disposal of the research made the investigation possible, and to the members of his staff for their continual help and coöperation ; to Dozent Dr. Rach, Primararzt at the Am Tivoli Hospital, Meidling, for valued help and support over a long period ; to Dr. S. S. Zilva of the Lister Institute, for a supply of purified foodstuffs in connexion with the experiments on animals ; and to the Foreign Office and the British Legation in Vienna for kindly arranging the regular transport of these materials.

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(*Continued at foot of next column.*)

NOTE ON THE X RAY DIAGNOSIS OF RICKETS.

By HANS WIMBERGER.

In infancy it is only the diaphyses, with their expanded ends, the metaphyses, which are to be seen in the Rontgen photographs. Certain long bones, however, show centres of ossification in the otherwise translucent epiphyses. In the normal long bone of an infant the ends of the metaphysis towards the epiphysis are terminated by a fine homogeneous, densely-calcified margin ; towards the diaphysis is a lighter transverse zone, very narrow, of ill-defined structure, out of which arise the fine meshed trabeculæ of the spongiosa. The peripheral margin of the compact bone is sharply differentiated from the soft tissues. The diagnosis of rickets by X ray is based principally upon careful observations of quantitative alterations in calcium content of the bones. This demands frequent photography, which must reach a high standard of technique. Changes in the *form* of the bones are a second diagnostic point when the disease is well established.

The first suggestions of rickets are shown radiographically in the primary calcification zone, which loses its homogeneity, appears wider and less well-defined, and may show definite defects of calcification. As calcium content is reduced in this area, the sharp end-margin of the metaphysis is lost and a fine fringe becomes visible, due to partially calcified trabeculæ projecting into the epiphyseal cartilage. As the disease progresses the terminal part of the bone is decalcified more rapidly at the centre than at the periphery ; here the projecting ends of the compact bone retain their lime salts longer, so the familiar cupped appearance of the ends of rachitic bones is produced. Such cupping, however, varies much in degree according to the original shape of the bone concerned and the severity and duration of rickets. Further, the terminal portion of the cancellous bone shows a coarsening of structure in X ray as the finer of the calcified trabeculæ are absorbed and replaced by an apposition of osteoid tissue only (osteoporosis). Decalcification can cause the compact bone of the shaft to become almost invisible, and in the most severe degree of osteoporosis, rachitic bones can no longer be differentiated from the soft tissues. In severe rickets a marginal shadow may appear along the shafts of the long bones. This represents the result of abnormal periosteal activity (osteophytic layer) during the disease and only becomes sharply defined after healing has set in and calcification has recommenced.

The beginning of healing after severe rickets is even more readily recognised radiographically than the onset of the disease. The first evidence is the appearance in the X ray plate of a new primary calcification zone between the epiphysis and the abnormal (radiographically invisible) tissue formed in the metaphysis during the rachitic period. The distance between this new zone and the diaphysis depends upon the duration of the disease. With progress in healing, lime salts are deposited in the intervening space as the rachitic portions of the metaphysis are restored. Past rickets of moderate or severe degree is recognisable for a long time (up to two years) afterwards,

(*Continued from previous column.*)

(1921) : Ibid., xviii., 298. Hess, Unger, and Pappenheimer (1921) : Ibid., xix., 8. Hess and Unger (1921) : Amer. Jour. of Diseases of Children, xxii., 186. Huldschinsky (1919) : Deutsche med. Wochenschr., xlv., 712. Huldschinsky (1920) : Zeitschr. f. Kinderheilkunde, xxvi., 207. Hutchison (1922) : Quart. Jour. Med., xv., 167. Korenchevsky (1921) : Brit. Med. Jour., Oct. 8th. McCollum, Shipley, and others (1921) : Proc. Soc. Exp. Biol. and Med., xix., 43. McCollum and co-workers (1921) : Johns Hopkins Hospital Bulletin, xxxii., 363. McCollum and co-workers (1921) : Jour. Biol. Chem., xlvii., 507. Mellanby (1918) : Jour. Physiol. Proc., lii., 11. Mellanby (1919) : THE LANCET, i., 407. Mellanby (1921) : Medical Research Council Special Report, No. 61. Paton (1922) : Glasgow Medical Journal, March. Paton, Findlay, and Watson (1918) : B. M. J., ii., 625. Paton and Watson (1921) : Brit. Jour. Exp. Path., ii., 75. Powers, Park, Shipley, McCollum, and Simmonds (1922) : Jour. Amer. Med. Assoc., lxxviii., 159. Schmorl (1909) : Ergebnisse inner. Med. und Kinderheilk., p. 4.

less by the persistently club-shaped end of the metaphysis than by the difference in structure between the healed metaphysis and the portion of the diaphysis formed before onset of the disease. The former has a particularly fine, dense, almost over-calcified structure and the latter a rarefication of the spongiosa which long remains unchanged.

Different bones react very differently to rickets. Radiographic examination shows that the earliest symptoms appear in the most rapidly growing metaphyses, which also suffer most damage when the disease is prolonged. Such are the sternal ends of the ribs, the distal ends of the femur, and proximal ends of the humerus, tibia, and fibula. For X ray diagnosis the ribs are unsuitable owing to the difficulty of obtaining a good picture; the distal end of the ulna is, however, almost as readily affected by rickets, and is easily photographed on account of the thin covering layer of soft tissues.

Even in this preliminary communication mention must be made of the value of X ray photographs for measurement of growth of normal and rachitic bones, as it surpasses in accuracy all other methods in the living subject. The most rapid growth, observed by this method, occurs in spring and early summer, and the slowest from December to March. In cases of rickets this retardation of growth begins earlier than in normal infants, and the disease often appears to be preceded by a long period of absolute cessation of growth.

A CASE OF
MALIGNANT MELANOMA OF THE GUM.

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MALIGNANT melanoma is one of the less common forms of cancer: in the past 12 years only 26 cases have been examined in the pathological department of the Leeds General Infirmary. Most of these tumours arise in connexion with the skin or the uveal tract of the eye; less common sites are the muco-cutaneous surfaces of the eye, the external genitalia, and the anus, while a very rare site is the pia-arachnoid covering the medulla oblongata. In all these positions melanin-containing cells are normally present. In the mouth the tumour is of comparatively rare occurrence, the palate, cheeks, and jaws being the parts chiefly affected. In a series of 70 cases of malignant melanoma collected by Broders and MacCarty (1916[1]) the jaw was primarily affected in five. Of 45 cases collected by Eve (1903[2]) from the records of the London Hospital—over a period of 20 years—one originated in the palate and one on the inside of the cheek. The literature of malignant melanoma of the palate has recently been reviewed by New and Hansel (1921[3]), who found 25 cases recorded, including their own. In man the mucous membrane of the mouth is normally unpigmented, but in many of the lower animals—e.g., the cat and dog—extensive pigmentation may be present. Roy (1907[4]) believes that in man melanosis of the palate is always of serious significance; it may be either the precursor or the accompaniment of malignant disease. In the case reported by him melanotic pigmentation of the palate had existed for over 16 years before the melanomatous new growth made its appearance.

The present case is one of malignant melanoma of the alveolus of the right upper jaw occurring in an edentulous subject.

Mrs. A., aged 62, was seen on August 29th, 1920. Ten days before she had noticed that an upper denture, which she had worn for over 20 years, had become uncomfortable, and on using a mirror she discovered that there was a blue-black lump on the gum beneath. On examination there was a bluish-black, almost gangrenous-looking area in the position where the right upper molar teeth had been. It only projected very slightly from the surface of the gum, and there was no ulceration. There did not appear to be any roughness on the denture. There was no evidence of lymph-gland enlargement. Under general anæsthesia the dark mass was freely excised, together with a margin of unpigmented mucosa and a portion of rather sharp underlying bone. The wound healed rapidly and the patient left the nursing home on the seventh day. Now, 20 months later, she is in good health, and free from any sign of recurrence or metastasis.

Microscopically, the tumour is a typical, richly cellular, malignant melanoma of spindle-cell sarcomatous type. The tumour cells run in interlacing bundles after the manner of a uterine fibromyoma, but the individual cells are shorter and stouter, and the nuclei are larger and more abundantly supplied with chromatin. Most of the nuclei are oval or rod-shaped; some are round, while others are quite irregular. There is also considerable variation in size, including the presence of a few "giant" nuclei. Numerous mitotic figures can be seen, many of irregular form. A large proportion of the cells contain melanin in varying amount, while different parts of the tumour also show varying grades of pigmentation. In some of the most heavily pigmented cells the nucleus is quite obscured, but this is exceptional. Cells in a state of mitotic division contain, as a rule, little or no pigment. The tumour is covered on the surface by thin, but still intact, squamous epithelium, from which all the papillæ have been flattened out by pressure. The peripheral and deep margins of the tumour are ill-defined, and outlying groups of branching, heavily pigmented cells can be seen here and there, notably in the papillæ of the surrounding skin.

Remarks.

The case is interesting, in the first place, as an example of melanoma arising in an unusual situation, the alveolar margin of an edentulous upper jaw. The colour of the tumour, bluish-black, is its most striking clinical feature, and is practically diagnostic. The only lesion with which there is any likelihood of its being confounded is the ordinary myeloid epulis, and here the colour varies from dark-red to plum-colour. The association with the prolonged use of a denture (20 years) is worthy of note, although there is no evidence to show that this had caused any undue irritation. The patient's attention had only been drawn to the part ten days before she sought medical advice, and the denture itself was not roughened. On the other hand, a small projecting spicule of bone was found at operation, growing from the jaw immediately beneath the tumour. Of the 25 cases of malignant melanoma of the palate collected by New and Hansel (1921[3]), two only gave a history of injury. In Roy's (1907[4]) case the tumour developed in a patch of pigmentation which followed injury to the palate by a pipe-stem. Treves's (1887[5]) patient had worn a vulcanite plate for four years. It had never been quite comfortable, and had caused considerable irritation of the palate. The tumour made its appearance upon this irritated part.

The prognosis in malignant melanoma of the palate is bad—worse, if possible, than in the cutaneous variety. It "metastasises early, usually first in the neighbouring lymph glands" (New and Hansel). In one-third of these authors' cases the tumour was regarded as inoperable at the time of the first examination, and in nearly two-thirds the cervical glands were involved. In the case here described the patient did not delay in seeking advice, with the result that the tumour was actually removed within a fortnight of its being discovered. Now, 20 months later, the patient is in good general health and presents no evidence of further mischief. At the same time, we feel that, in spite of early and free removal, only a guarded prognosis can be given.

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AN AGGLUTINATING SERUM

FOR CERTAIN STRAINS OF TUBERCLE BACILLI.

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IN 1905 Arloing and Courmont observed that the era of certain individuals suffering from active pulmonary tuberculosis had the power of agglutinating emulsions of tubercle bacilli. Later Koch established the same fact with patients under treatment with emulsions of tubercle bacilli. At the same time Koch demonstrated that animals also responded to the injections of these emulsions by the production of agglutinins which gradually increased in power. Levine readily produced precipitins in the sera of rabbits by a few injections of the original tuberculin. Baldwin showed that agglutinins as well as precipitins could be produced by injecting rabbits subcutaneously or intraperitoneally with tuberculin. Many observers have since studied the productions of agglutinins and precipitins in both human beings and in animals. It therefore seemed that to produce an agglutinating serum of considerable titre, by injecting emulsions of a non-virulent living strain, would not be difficult.

A non-virulent strain of human tubercle bacilli was obtained from the National Collection of Type Cultures. This strain, *B. tuberculosis* Koch, was obtained by Raw (1920) from Koch in 1905. A rabbit was given intravenous injections of living bacilli. The first dose was 5 mg. of a moist culture emulsified in a few c.cm. of salt solution. The doses were given at five-day intervals, and increased by 5 mg. each time until the final dose of 30 mg. The rabbit was bled and the serum tested at intervals. Agglutinins were first noted five days after the second injection, the titre of the serum being 1 in 25. After the sixth dose the titre of the serum against the homologous strain was 1 in 1600. The rabbit was then anæsthetised and bled out. A serum with such a titre having been obtained, its agglutinating power was tested against other human and bovine strains of tubercle bacilli, mainly obtained from the National Collection of Type Cultures and from the Wellcome Research Laboratories.

Technique of Agglutination Test.

The main difficulty attached to this agglutination test is that of preparing homogeneous emulsions; especially is this the case with bovine strains. Human strains of tubercle bacilli were grown on glycerine egg and bovine strains on ordinary egg media. Suitable quantities of bacilli were placed in thick-walled test-tubes containing salt solution and glass beads. These were shaken for several hours in the mechanical shaker and then stood in a test-tube rack for at least two hours in order that all coarse particles might sediment. The supernatant homogeneous emulsion was pipetted off and reduced to a standard density by comparison with suspension of barium sulphate in 1 per cent. sodium citrate. The method of performing the agglutination test was the usual macroscopic one of doubled dilutions of serum. To 0·5 c.cm. of serum dilution in each tube 0·5 c.cm. of the standardised emulsion was added. Two control tubes were used for each test, one contained 0·5 c.cm. of salt solution along with 0·5 c.cm. of bacillary emulsion, the other contained 0·5 c.cm. of a 1 in 25 dilution of normal rabbit serum together with 0·5 c.cm. of emulsion. The tubes were incubated in the water-bath at 55° C. for two hours, care being taken to obtain good convection currents. Readings were taken half-an-hour after removal of the tubes from the water-bath.

Eleven strains of human tubercle bacilli tested against the serum gave the results shown in Table I.

Table II. shows the effect of the serum on six bovine strains.

TABLE I.

Strain.	Dilution of serum.						
	1/50	1/100	1/200	1/400	1/800	1/1600	1/3200
H 1 ..	+ + +	+ + +	+ + +	+ + +	+ + +	+ +	−
H 2 ..	+ + +	+ + +	+ +	−	−	−	−
H 3 ..	+ + +	+ + +	+ + +	+ + +	+ +	+	−
H 4 ..	+ + +	+ + +	+ + +	+ + +	+ +	+	
H 5 ..	+ + +	+ +	+	−	−	−	−
H 6 ..	+ + +	+ +	+ +	−	−	−	−
H 7, 8, 9, 10	−	−	−	−	−	−	−
H 11 ..	+ + +	+ +	+	−	−	−	−

+ + + = Complete sedimentation. + + = Partial sedimentation and flocculation. + = Flocculation (homologous strain).
Controls.—Salt; normal serum.

TABLE II.

Strain.	Dilution of serum.			Strain.	Dilution of serum.		
	1/50	1/100	1/200		1/50	1/100	1/200
B 1, 2 ..	−	−	−	B 4 ..	+ +	−	−
B 3 ..	+	−	−	B 5, 6	−	−	−

Controls.—Salt; normal serum.

Estimation of Precipitins in the Immune Serum.

The homologous strain (H 1) was used for preparing the antigen; the method of preparation is that used by Douglas (1921) in working with *B. dysenteriæ* Shiga. Tubercle bacilli were scraped off egg slopes and placed in a fat-extraction thimble. These bacilli were then extracted with acetone in a Soxhlet apparatus for 48 hours. After drying, 20 mg. of extracted bacilli were emulsified in 2 c.cm. of salt solution in a small test-tube; 0·2 c.cm. of 1 per cent. sodium carbonate solution, 0·02 c.cm. of sterile trypsin solution were then added together with a few drops of ether to prevent bacterial growth. The tube was then sealed and placed in an incubator at 37° C. for 48 hours. Little difference in the amount of extracted tubercle bacilli present could be detected at the end of incubation. The tube was then centrifuged and the supernatant clear fluid used. In this test 1 c.cm. of diluted antigen and 0·1 c.cm. of serum were added to each tube. The tubes were incubated at 55° C. for two hours. The result was as given in Table III.

TABLE III.

Dilution of antigen.							
1/2	1/4	1/8	1/16	1/32	1/64	1/128	1/256
+ + +	+ + +	+ + +	+ + +	+ + +	+ +	+	−

An antigen was prepared from a bovine strain (B 4) in a similar way and 0·1 c.cm. of the serum added to 1 c.cm. of the diluted antigen. This gave the result shown in Table IV.

TABLE IV.

Dilution of bovine antigen.						
1/2	1/4	1/8	1/16	1/32	1/64	1/128
+ +	+ +	+	−	−	−	−

The amount of precipitate formed with the bovine antigen, even in the 1 in 2 dilution, was only about one-third of that formed with human antigen in the same dilution.

Conclusions.

The preparation of an agglutinating serum for certain strains of tubercle bacilli is one which presents

little difficulty when a non-virulent strain is used for immunisation and when the dosage is ample. Since the first agglutinating serum was prepared additional rabbits have been immunised, and it has been found that these animals remain in excellent condition despite the large doses. These non-virulent cultures are apparently also non-toxic. This property has already been demonstrated by Raw. By this agglutinating serum it is shown that the various strains of human tubercle bacilli do not belong to one serological group; further, 11 strains have been divided into three classes—first, those agglutinated to titre; secondly, those agglutinated to a 1 in 200 dilution of the serum; and thirdly, those not agglutinated by a 1 in 50 dilution. Whether these classes are really serological groups remains to be proved. Brownlee maintains that there are probably two, if not three, types of infecting bacilli. It also is shown that precipitins are produced fairly readily in the course of immunisation. Both by agglutination and by the precipitin test there is evidence of a group reaction with certain strains of bovine tubercle bacilli.

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SOME OBSERVATIONS ON THE DIAGNOSIS OF ADRENAL INSUFFICIENCY.

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THE condition of adrenal insufficiency has, of recent years, received considerable attention from French clinicians, though its importance has not been so widely recognised in other countries. Many cases are now on record where, after a brief and fatal illness, there was discovered at autopsy no adequate cause of death except some destructive process of the adrenal glands. Certain authors have extended the scope of the above work and have endeavoured to define a condition of *mild* adrenal insufficiency produced by less severe disturbance of the glands. The main functions of the glands are regarded as two in number: to maintain cardio-vascular tone and to neutralise toxins, and the cardinal symptoms of the condition are therefore hypotension and asthenia. Many diverse clinical conditions have been ascribed to a common adrenal origin. The "typhoid state" in the acute infectious fevers, pernicious vomiting, and dysmenorrhœa are attributed to neutralisation of the active principle of the glands by toxins, surgical shock to reflex inhibition of the secretion, and certain forms of debility and neurasthenia to exhaustion of the glands. The clinical picture being thus so varied, certain recognition of these cases becomes almost impossible in the absence of some pathognomonic sign. This Sergent[1] claims to have supplied in a skin reaction which he terms the white line of adrenal insufficiency ("*ligne blanche surrénale*"). Owing to the condition of hypo-adrenia, the peripheral arterioles are said to be more dilated than usual. Light mechanical stimulation brings about constriction of these vessels, the blood-supply of the corresponding area of skin is diminished, and a white line thus produced. In view of the great significance which has been attached to this sign by many authorities, it was thought that a systematic reinvestigation of the subject would be of interest.

Though the literature contains many observations which have been made on subjects suffering from various morbid conditions, no thorough investigations are recorded on the normal subject. In the absence of satisfactory control experiments it is difficult to decide on the value which may be attached to the mass of clinical evidence which has already been accumulated.

The Present Investigation.

The subjects of the present research were a number of healthy young medical students attending the course of physiology in this medical school. The technique adopted was as follows:—After the clinical history had been taken the subject was placed in the recumbent position for some minutes with the abdomen free but lightly covered. A geometrical figure was then lightly traced on the skin of the abdomen with the round smooth end of a fountain-pen. The directions of Sergent were closely followed. No pressure was exerted, and no scratching occurred. The response was then noted.

The blood pressure was taken in all cases in the recumbent position with the arm at heart level. The instrument employed was an aneroid type of sphygmomanometer (Tycos). The auscultatory method (Korotkoff) was used. The diastolic end-point was taken as Point V. of Swann—i.e., the disappearance of all sound. It soon became obvious, contrary to what had been expected, that many normal individuals gave a white line in response to light stroking. The white line when present varied widely in intensity and definiteness, and also depended in a manner to be described on the strength of stimulus employed.

Sergent[1] has given certain criteria of the "true" *ligne blanche surrénale*. This line appears after a definite latent period; it lasts for one minute or longer; it appears gradually, slowly intensifies, and finally fades; it is not preceded, accompanied, or followed by any red lines whatever. No response was accepted as positive unless it showed all the features detailed. For purposes of description it was thought advisable to define two main grades of response:—(1) Marked (++): The line was perfectly definite, and could be seen with great ease. The edges were clear-cut. (2) Definite (+): The line could not be seen so easily, or was only brought out on carefully shading the skin. The outline was not so sharp. A third group, in whom the response was negative, was also recognised. It comprised those individuals in whom the white line was preceded or accompanied by a red line; where the white line was too indistinct to be quite certain about, or where no response at all could be observed. One hundred individuals were examined, and the results obtained are summarised in the accompanying table.*

Table Showing Average Pressures in Mm. Hg.

Average pressure.	White line.		
	Marked.	Definite.	Negative.
Systolic	130 mm.	129 mm.	132 mm.
Diastolic	69 ,,	70 ,,	72 ,,
Pulse	61 ,,	59 ,,	60 ,,
Percentage of cases ..	27	39	34

As will be seen from the last line of the table, no fewer than 66 per cent. of the normal subjects examined showed the white line. Sergent, however, insists that the true *ligne blanche surrénale* must have an *intensité vive*. It is a matter of some difficulty to decide in any individual case whether this requirement is fulfilled, but even if all cases described as "white line definite" are excluded, there still remain 27 per cent. of normal persons who give a response identical with that which is alleged to be indicative of adrenal insufficiency. The average blood pressures, both systolic and diastolic, in the three groups correspond very closely to one another. The average systolic blood pressure in Group I. (white line marked) was 130 mm. Hg, the range being from 150 mm. to 118 mm.; in Group II. (white line definite) 129 mm., the highest being 146 mm. and the lowest 108 mm.

* A fuller account of the results will be published elsewhere.

In Group III. (white line negative) the average was 132 mm., the pressures lying between 158 mm. and 114 mm. The diastolic pressure figures are equally striking. In Group I. the average was 69 mm. and the range 90–60 mm.; in Group II., 70 mm. and 80–55 mm.; in Group III., 72 mm. and 90–65 mm., respectively. There does not, therefore, appear to be any relation between the height of the blood pressure and the intensity of the white line. Many individuals with high systolic or high diastolic pressures gave very marked reactions, while some with low pressures gave negative responses.

Other "White Lines."

A careful examination of the literature shows that a number of physiological responses have been described which bear a close resemblance to the phenomenon of Sergent. As long ago as 1875 Vulpian described a white line which could be seen in normal individuals after lightly stroking any region of the skin "à condition que l'excitation ne soit pas très énergique." He quotes Bäumler [3] (1873), who made a similar observation. L. R. Müller [4] has made an extensive study of the various types of dermographism and their significance. He has obtained a white line (dermographia alba) on superficial stroking in many normal young individuals, especially those with dark skins. After the age of 45 it is less common to obtain this response. The line was best marked in patients with certain nervous diseases—i.e., tabes, disseminated sclerosis, transverse myelitis (on the paralysed side of the body). He appears to be unaware of the work of Sergent, but his technique is identical in all essential features. He thinks it questionable if this "dermographia alba" has any diagnostic significance. Cotton, Slade and Lewis [5] have repeated and confirmed Müller's observations. The subjects in their case were soldiers in a military hospital who were suffering from disordered action of the heart. Reference may also be made to the work of Tracy.[6] This observer, from an examination of a large number of individuals, claims that the normal reaction of the skin to a mechanical stimulus is a brief vasodilatation followed by a more prolonged vasoconstriction. In some subjects one of the two components of the reaction was absent. It is argued that these differences depend on variations in the hormone content of the blood. A double innervation of the blood-vessels of the skin from the sympathetic and autonomic is assumed. The vasodilatation is supposed to be due to activation of the autonomic fibres by the hormone X of Eppinger and Hess (autonomyn), while the vasoconstriction results from stimulation of the sympathetic by adrenalin. If both components of the reaction are present, both hormones are assumed to be present in the blood. If the vasodilatation component alone is present—hormone X or its analogues are in excess in the blood, or the hormone adrenalin (or pituitrin with similar action) is in insufficient amount to activate the sympathetic nerve-endings in the blood-vessels tested. If the vasoconstriction component alone is given the reverse condition is present.

No attention was paid in this investigation to the strength of the stimulus employed. I am unable to confirm Tracy's observations, and in any case it is very improbable whether they can bear the interpretation he places on them. It must be stated that most of the theoretical assumptions made by him are entirely unsupported by any authentic evidence.† The white line of Bäumler, Vulpian, and Sergent, the dermographic alba of Müller, and the white tâche of Lewis appear to be the same phenomenon, one which is present quite commonly in normal healthy people. Contrary to the views of Sergent, one must conclude that the white line has no pathognomonic significance, though it is of interest to inquire more deeply into its exact nature and mode of production. The bearing of this conclusion on the diagnosis of adrenal insufficiency will be discussed subsequently.

The Blood-vessels Involved.

It has already been noted that Sergent regarded the "white line" as an arteriole phenomenon. He believed that the mechanical stimulus produced constriction of the previously dilated arterioles, with the result that blanching of the skin was effected. Considerable evidence may, however, be adduced against this hypothesis.

Characteristically, the white line is limited to the area of skin stimulated and is quite sharply outlined. Müller [4] points out that this would not be the case if the blanching were due to constriction of arterioles. Each arteriole supplies an irregular area of skin and the local anæmia resulting from its contraction would similarly be irregular in outline and not follow strictly the line of the stroke. The chief features of the white line can, however, be readily explained if local constriction of the capillaries themselves is assumed. The white line can be obtained almost as easily on the skin of the forearm as on the abdomen. If the arm be raised to the horizontal and the pressure in an armlet is rapidly run up to 70–80 mm. above the blood pressure of the subject—i.e., to about 200 mm. Hg—it is found, as pointed out by Cotton, Slade, and Lewis,[5] that the white line can still be obtained, and that its time relations remain unchanged. The same holds true even if an interval of ten minutes is allowed to elapse after applying the armlet.

If the circulation is normal, the blocking of an arteriole empties the corresponding capillaries, because the blood previously contained within them flows on into the veins. The effect of compressing the arm in this experiment has been, however, to slow down or stop completely the flow in the vessels below the block and produce a stagnant circulation. In such a system constriction of the *arterioles* would drive blood out of them into the capillaries and dilate them still further as their contents could not pass on in the normal way owing to the obstruction to the natural outflow from the veins. The blanching of the skin must therefore be due to the contraction of the capillary wall, which actively drives the blood out into the neighbouring veins. It may thus be concluded that the white line is due to local emptying of the capillaries as a result of active contraction of some elements in their walls, and is quite independent of the condition of the arterioles.

Functions of the Capillaries.

It must be admitted that this view is not in accord with orthodox teaching, which hitherto has assigned to the capillaries a purely passive part in the circulation. Recent researches, physiological and clinical, seem to show that these older conceptions must be seriously modified.

Krogh [7] in a series of papers has confirmed and extended the older work of Stricker, Steinach and Kahn, and Roy and Graham-Brown. He has made many observations on the frog to show that the reactions of the capillaries can be independent of the simultaneous reactions of the arterioles and are always practically independent of the arterial pressure. Dale and Richards,[8] working with histamine obtained a fall of blood pressure when the arterioles were contracted. They could only explain their results by assuming that histamine acted directly on the capillaries and produced this active dilatation. Rouget [9] has described branched cells arranged outside the capillaries which he considers to be the contractile elements.

Many observations on the human subject have been made at the Tübingen clinic with the capillaroscope (hautkapillarmikroskop) of Müller-Weiss [10] by means of which direct inspection can be made of the capillaries in man. Attention is chiefly directed to the skin at the root of the nail where the capillaries do not run vertically as elsewhere, but horizontally. The results obtained by this means are in full agreement with the conclusions of the previous workers mentioned.‡ In

† Krogh (Jour. of Physiol., 1920, liii., 417) is extremely sceptical on the question of the supply of the capillaries by the autonomic nervous system. For a criticism of hormone X, see Swale Vincent, Endocrin., 1917, i., 459.

‡ This work has been repeated and extended in this laboratory. The results will be published elsewhere.

the present state of knowledge, the burden of proof appears to be, as Sir Thomas Lewis [9] remarks, with those who deny any powers of active contraction to the capillaries.

Relation of Response to Strength of Stimulus.

In many of the subjects the relation of the response to the strength of the skin stimulus was investigated. When a definite white line was obtained on very superficial stroking, gradually increasing the strength of stimulation produced the following results. The line, which at first was quite distinct, with clear-cut edges, became wider and more indefinite in outline; then a vague whiteness or no response at all was obtained. The next stage was a central pink tint, leading on to a definite red line which was often flanked by a white line on either side. Using the criteria discussed earlier, this red line can be shown to be due to capillary dilatation. Heavier stimulation, giving rise to actual pain, produces a flush which can readily be shown to be arterial in origin. When the white line was not obtained, heavier stroking at first produced no response. On further increasing the strength of stimulation, a red line, not accompanied by white lines, results.

The following stages may thus be recognised in the normal vascular responses of the skin: (1) Capillary constriction (white line); (2) no visible response; (3) capillary dilatation (red line); (4) arterial dilatation (flush). In a proportion of subjects the first effect is not obtained. The red line and flush, on the other hand, are constantly present. The capillaries, therefore, respond differently to weak and strong stimuli; a weak stimulus produces constriction, a strong stimulus dilatation. The central red line of the red and white reaction, mentioned above, is thus due to the heavy stimulus over the line of the stroke; the bordering white lines result from the weaker stimulus where only slight stretching of skin has occurred.

It is improbable that the capillary reflexes are carried out through the central nervous system, because of the accurate way in which the reaction is limited to the area stroked. Müller believes that they are due to direct stimulation of the capillary wall, heavy stroking paralysing the contractile elements with consequent dilatation, a lighter stroke producing contraction. Krogh,[11] from his experiments in the frog, agrees that they are not true reflexes because they are unaffected by section of the nerves to the part. The response to local stimulation is, however, abolished on the application of cocaine, and he is therefore inclined to the view that they are axon-reflexes. The sensory nerves divide to provide the capillaries (and arterioles) with vasodilator fibres, and to supply sensory nerve-endings which are capable of responding readily to mechanical stimuli. Other nerves and nerve-endings (with an even lower threshold value) may be responsible for capillary constriction. In subjects not giving the white line, the two opposing effects would appear to neutralise one another, until a certain grade of stimulation is attained.

General Conclusions.

The position of the syndrome of mild adrenal insufficiency may now be reconsidered. The theoretical conceptions underlying most of the clinical work are not supported by recent experimental investigations. It has been shown by Stewart and others that complete extirpation of the adrenals in an animal causes death in a short time. If, however, a small portion of the glands be retained, no ill-effects whatever seem to result. It has not been possible so far to reproduce any condition of *mild* suprarenal insufficiency. It is consequently difficult to conceive what the symptoms of such a condition ought to be. Little help can be obtained from acute insufficiency; the symptoms in that case are simply those of approaching dissolution, and an observer unaware of what had been done to the animal could not recognise, with any certainty, the cause of its condition.

Great stress has been laid in the clinical work on low blood pressure. This is regarded as a very characteristic symptom and is attributed to suppression or deficiency of the adrenin of the gland. The theory that the normal blood pressure is maintained by the action of adrenin has been severely criticised by modern authors, and the evidence against it will be found summarised in the papers of Swale Vincent [12] and Stewart.[13] It has been shown, for example, that clamping both adrenal veins does not result in any lowering of the blood pressure. The blood pressure, too, is unaffected in an animal in which all the suprarenal tissue has been removed with the exception of a small piece of cortex. Finally, any amount of adrenin normally poured into the blood-stream would probably tend to *lower* and not to raise the blood pressure. Hypotension, therefore, cannot be regarded as specially indicative of adrenal insufficiency. The other symptom on which considerable reliance has been placed is asthenia. This has been attributed to the accumulation of toxins normally neutralised by the secretion of the adrenals. The question has been carefully studied by Camus and Porak and others, and the general conclusion is that there is no certain proof of such antitoxic action as has been supposed to exist. The value of the therapeutic test as an aid to diagnosis has already been discussed. It is suggestive to note that equally effective cures are attributed to such widely different substances as pure adrenin and extracts of whole gland. It must be remembered, too, that the symptoms of adrenal insufficiency would be those arising from a disturbance of *all* the functions of the gland, those of the cortex and those of the medulla; in most of the clinical records, however, there is an attempt to correlate the symptoms with the supposed functions of the medulla only.

The claim of Sergent, that the white line described by him is pathognomonic of adrenal insufficiency, has not been substantiated by the investigation recorded in this paper. It has been shown, on the contrary, that the white line occurs in a large proportion of healthy individuals, and that it is not related in any way to the height of the blood pressure, whether systolic or diastolic. The view that the white line is a physiological occurrence has been supported by the work of the other authors who have been quoted.

It would appear from the foregoing that it is premature to attempt to recognise clinically a condition of mild suprarenal insufficiency until our knowledge of the part played by the adrenals in the normal body is considerably extended.

Summary.

1. It is shown by an investigation of 100 healthy individuals that the white line of Sergent is a phenomenon occurring in a large proportion of normal subjects and is without pathological significance.

2. A number of analogous physiological responses are described.

3. The white line is not related to adrenal insufficiency or to abnormally low systolic or diastolic pressure.

4. The white line is produced by local emptying of the capillaries from the active contraction of some elements in their walls, and is quite independent of the condition of the arterioles.

5. A nervous mechanism of the nature of an axon-reflex may be involved.

6. The bearing of this investigation on the clinical recognition of adrenal insufficiency is discussed.

I must thank Prof. Swale Vincent for his kindly encouragement and advice throughout this investigation. I am indebted to Mr. D. E. Bedford for much assistance. The expenses of the research have been partially defrayed by a Government grant made through the Royal Society.

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Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF TROPICAL DISEASES AND PARASITOLOGY.

The Spread, Probable Mode of Infection, and Prophylaxis of Leprosy.

A MEETING of this section of the Royal Society of Medicine was held on June 12th, when Sir LEONARD ROGERS, F.R.S., read a paper on this subject. He said that the control of leprosy is a most difficult problem owing to our ignorance of the exact mode of infection, and failure hitherto to isolate early but infective cases. The absence of a reliable method of treatment to attract early cases and prevent their disease being hidden as long as possible, had been one of the difficulties. Sir Leonard Rogers traced the spread of leprosy over the world. It was first described in Egypt and India about 1500 B.C., and appeared in Greece about 350 B.C., spreading all over Europe and becoming more prevalent after the Crusades, invading the Western Hemisphere soon after it began to decline in Europe, while during the last century it appeared in epidemic form in Hawaii, Loyalty Islands, and New Caledonia, having been introduced by the Chinese in some instances at least. The whole history was that of a communicable disease slowly spreading over the world.

From the time of Moses leprosy was considered to be an infectious disease, but during the nineteenth century that view was largely discarded in Europe in favour of its hereditary origin, mainly based on writings of Norwegian authorities, who looked on the occurrence of more than one case of leprosy in four generations of a family, including collateral descent, as evidence of hereditary taint and completely ignored the possibility of family or household infection; but the absence of hereditary propagation among Scandinavian lepers living under favourable hygienic conditions in the United States of America, the frequency of the infection of Europeans without hereditary taint in the tropics, and the too rapid spread of the disease in Oceania to be explainable by heredity had greatly shaken that theory, even before Hansen's discovery of the lepra bacillus in 1874 afforded a firm basis for the communicability of the disease.

A study of the incidence, or rates per 1000 of population, indicated that all the most severely affected places, with rates of 5 per 1000, or ten times the rate in India, and upwards, are situated in hot damp climates within the tropics, which may be favourable to the survival of the bacillus outside the human body, thus facilitating infection. For example, Central Africa from French Guinea and Northern Nigeria across to Abyssinia show rates of from 5 to 60·7, islands of Oceania from 26 to 66·7, and Trinidad and Guiana from 16 to 25 per 1000. Between the tropics and 35° latitude, comparatively low rates up to under 1 per 1000 prevail, while in more northerly latitudes, Iceland showed 3 in 1896, Norway 1·91 in 1856, and Japan 1·94. It was pointed out that in cold countries the houses are artificially warmed during the winter months, so that the conditions may be more favourable to a house infection with frequent close contact than warmer sub-tropical countries with open-air life all the year round. Other conditions favouring the spread of leprosy were a low state of civilisation, leading to overcrowding and promiscuity in one-roomed houses; absence of fear of the disease and great sociability as in Hawaii; a low state of morals and such customs as eating out of a common dish with the fingers and smoking a common pipe. The discharge of lepra bacilli from the nose and mouth in sneezing, coughing, &c., and from ulcerating nodules, readily accounted for infection through close contact with lepers.

The Probable Mode of Infection.

The long incubation period (two to eight or more years) made it very difficult to trace the source of infection in countries where leprosy had long been widely prevalent, but a number of instances of its spread through families and intimate friends in recently-infected countries were on record. From the literature of the last 60 years Sir Leonard Rogers had collected 700 recorded instances where the probable source of infection was traced; analysis of these showed nearly one-fifth to have been through conjugal relationship or cohabitation with a leper, two-fifths were house or bed infections, nearly one-fifth arose from attendance on a leper, and the same proportion from close association with a leper, including children playing with leper children, and a few from infection by a leper wet-nurse, a leper's clothes, vaccination from a leper, or other methods of inoculation. The opportunities for such close contact with a leper usually extended over a considerable time, but in three instances intercourse with a leper woman on a single occasion was followed by leprosy infection after ten months, one, and two years respectively. A striking feature of the analysis was that in no less than 27 per cent. there was a history of sleeping in the same bed as a leper before the disease was contracted, while about four-fifths of the total cases were examples of house infections.

The exact way in which the bacillus passed from case to case, he said, was unknown, but a number of authoritative writers considered inoculation the usual method, probably through an accidental abrasion in the skin or mucous membrane. This theory would account for the fact that it is rare for more than one member of a household containing a leper to contract the disease at the same time, better than the theory of infection through the ingestion of the bacilli in food. The frequency with which leprosy affects the nerves of the lower extremity in countries where the people go bare-foot, and a case of leprosy apparently contracted by wearing the clothes of a leper, also support the inoculation theory. There are two cases on record of doctors developing leprosy in a hand inoculated during operations on lepers; moreover, two European boys inoculated themselves with sharp instruments immediately after they had been thrust into the tissues of native leper playmates. Evidence both from rarer recorded cases and from experience of carelessly performed arm-to-arm vaccination on a large scale, which increased the spread of leprosy in both Hawaii and in Mexico, had convinced the speaker that the ordinary mode of infection of leprosy was by entrance of the bacilli through the skin, including possible infection through insect bites, or mucous membrane into the deeper fibrous tissues, which, with the fibrous sheaths of the nerves, constitute practically the sole tissues in which the lepra bacilli were able to flourish and multiply.

Sir Leonard Rogers outlined the principles of prophylaxis, and the desirability of separating infective cases of leprosy, especially the tubercular ones, from contact with the healthy, especially children and adolescents between 5 and 20 years of age. Failure was often due to inefficiency or want of continuity in carrying out these measures, and to the hitherto insuperable difficulty in detecting and isolating the early cases, which are naturally hidden to avoid life-long imprisonment without hope of cure. Luckily the more effective treatment of leprosy by injection of soluble preparations of the unsaturated fatty acids of chaulmoogra, cod-liver, soya bean, and other oils, introduced by himself, and confirmed and extended by American workers in Honolulu, had already given sufficiently favourable results to have led early cases of leprosy to come forward in Hawaii and in India to ask for the new treatment. We were thus now in a much more favourable position to attempt to deal effectively with the reduction of, and eventually to stamp out, one of the most terrible diseases which afflicts the human race.

MEDICAL OFFICERS OF SCHOOLS ASSOCIATION.

"CARDIAC CHILDREN" AS A PUBLIC HEALTH PROBLEM.

AT a meeting of the Association held on June 26th, Mr. R. C. ELMSLIE, the President, being in the chair, Prof. F. S. LANGMEAD opened a discussion on this subject. The amount of recognisable cardiac disease in the schools was, he said, greater than the amount of tuberculosis in them. Tuberculosis brought with it an element of protection which the many acquired, but it was different in the case of rheumatism. In heart disease due to rheumatism the damage, though less progressive than that of tuberculosis, was more abiding, for hearts so crippled remained with some extent of crippling during the rest of life, and only too frequently the disease definitely shortened life. It was difficult to determine what was the proportion of rheumatic children in the schools or in the general population, but he believed the proportion to be quite double that of the published statistics. If it were regarded as only 3 per cent., that meant about 183,000 cases among the school population. One-third of the children attending schools for the physically defective were cardiac cases, and were so affected by their physical condition as to be incapable of profiting by the ordinary school curriculum. This was one of the most pressing health problems of to-day, and perhaps the most neglected. The acquired disease accounted for the predominant number of the cases, and rheumatic infection was the immediate cause, and it therefore demanded attention from the public health standpoint, for it was with the effects of so-called simple endocarditis that they were for the moment concerned.

Entry of Infection.

How did the infection gain entrance? A knowledge on this point was essential in any effective campaign to prevent its occurrence or limit its ravages. At present no means seemed available to combat the infective organism. The period before the rheumatic infection was likely to be the most successful. The second stage was that of the active rheumatism, a stage often silent in its onset, often protracted over many years, and the bounds of which it was difficult to define. The third stage often overlapped the second when myocardial disease existed. Many of the factors which stood behind the rheumatic infection were well authenticated. The influence of heredity was considerable; children with a rheumatic parentage must therefore be carefully watched, and symptoms and signs usually considered as of doubtful nature should in these be regarded as rheumatic and treated accordingly; residence on clayey, and possibly on chalky, soil, and in damp, low-lying districts should be avoided where that could be done. If the portal of entry of the rheumatic organism was known, could that portal be closed against it? The great path of entry was considered to be the tonsils and the naso-pharynx, but evidence of other modes of entry seemed less sure. Attention to nose and throat should be very definite, including the eradication of adenoids. The second or active stage of cardiac disease he did not propose to deal with; it came into the sphere of the general practitioner. As to the third period, that of declared cardiac disease, could anything be done to render these children capable of contributing to the work of the nation?

Three Classes of Case.

There were three classes of cases. In the first rheumatism either was over or was only latent, and the heart was only slightly damaged. Many such were discovered to have a valvular lesion, but appeared to be fit. These could be educated in the ordinary school and take part in its life, but their condition should be disclosed to parents and teachers, and the special value to them of warm and ample clothing, including good boots. There were children who were hampered by their cardiac disease, and many of these had a continuous smouldering rheumatic toxæmia. In this category were children who had been discharged from hospitals and infirmaries, but required further observation and treatment. This group required institutions combining observation and treatment with education; they should be within easy distance of, but not in, large towns, and should be large institutions, so as to justify having special instructors. Medical officers should control the hours of study and the degree and periods for exercise. There should also be an association with hospitals on one hand, and with well disposed employers on the other. When he was examining children for cardiac disease in the special schools he had 1302 cases before him. There were 611 cases of mitral regurgitation; congenital morbus cordis numbered 302; mitral regurgitation and stenosis, 196; mitral regurgitation and aortic regurgitation, 67; mitral stenosis alone, 52; mitral regurgitation, stenosis, and aortic regurgitation, 49; aortic regurgitation alone, 12; mitral stenosis and aortic regurgitation, 11; and only one with all four lesions; mitral stenosis and aortic stenosis, 1. He recognised the part played by schools for the physically defective in safeguarding children with heart disease, or in training them to earn their livelihood. He believed we had sufficient knowledge of cardiac disease in children and its cause to act upon it, and he was sure money used in this way would be well and economically spent. Our knowledge on the subject was largely due to English investigators, but in the application of it he feared we lagged seriously behind.

The Prospect of Cure.

Dr. W. P. S. BRANSON said the State approached this disease as it approached all others, from a three-fold aspect: (1) to prevent it; (2) to cure it; (3) in so far as these were not possible, to make such provision for the victims of it as circumstances allowed. It was very important to know what the infection in rheumatism was, and what were the avenues by which it established its hold on the body. There was still a divided opinion in the profession as to the specificity of the microbe discovered by Poynton and Payne; some believed the disease to be due to a variety of microbic agents. The settlement of this important question should not be beyond the reach of endowed and organised research, and he suggested that this society, armed with the tale of deaths and invalidism traceable to rheumatic infection, should urge the Medical Research Committee to take up the question. As to the path of entry, 12 years ago, when he was examining a school of girls in Bethnal Green, he encountered 13 cases of acquired heart disease which had not been previously detected, and it happened he had already recommended 10 of them for operation on account of nasal obstruction and tonsillar hypertrophy. He believed with Prof. Langmead, that this was the chief path of entry; some kind of nasal infection was a common feature of early stages of chorea. Therefore naso-pharyngeal hygiene was the first essential in prophylaxis against rheumatic infection. He was convinced that the swimming bath activated the infection in susceptible children, for many attacks of the disease had been precipitated by the chills incidental to this amusement. Swimming should be interdicted in children with a rheumatic tendency. As to the prospect of cure of heart disease, a heart with systolic apical murmurs might get the better of the condition, and the identification mark of this was the coincidence of a systolic murmur at the apex with an impulse which, though displaced outwards, yet showed no increased force. For the rest, he confessed that the cure of acute valvular endocarditis, in the sense of actively dismissing it and its deformities, was beyond therapeutic reach, and pericarditis would often end in adhesion between the two layers. The remedy must be sought in the laboratory. For that reason he asked for the assistance of the Medical Research Committee. On the question of exercise for these

cases, if a heart was mechanically handicapped by some enduring structural change, was it sound to attempt a countervailing effort on the chambers of the heart? The latent margin of power possessed by the heart should be conserved, for the organ would automatically give the hypertrophy needed in response to effort. This reserve was tapped in normal people who were training for sports, and when it became exhausted, the second line was used, hypertrophy. Therefore, if hypertrophy was an index of embarrassment already existing, the heart's power should be conserved, and in degree proportioned to the extent of the hypertrophy.

The provision necessary from the public health point of view, for children incurably affected with heart disease, was, he thought, an educational rather than a strictly medical question. Cardiac children, if crippled at all, were crippled permanently, and when the acute stage had passed the prospect was that they would get worse rather than better. All possible should be done to smooth the stormy passage which fate had decreed for them by the provision of educational amusements. It was necessary to have criteria for estimating the gravity of the disease. Cases could be divided into mild, severe, and grave, with the proviso that recent cases should have judgment upon them suspended for three months. Mild cases had mitral regurgitation without palpable hypertrophy, or symptomless præcordial murmurs without hypertrophy, suggestive of developmental faults. These should have naso-pharyngeal hygiene, and swimming should be banned. In severe cases one or more chambers were hypertrophied, indicating serious mechanical defect. These should not be allowed to compete with the ordinary children; special prophylactic measures should be used for them with the view of preventing a recurrence of rheumatism, and the parents of female cases should be warned of the dangers likely to attend their pregnancy. The grave cases had serious structural faults in the heart and exhibited failure under stresses which were not severe. Few of these patients outlived their childhood, and a good portion of their days was spent in hospitals. He did not regard the problem as insoluble, but pleaded for a recognition of its gravity and for organised research.

Great Prevalence of Heart Disease.

Dr. JAMES KERR emphasised the importance of the subject from the public health standpoint, owing to the great prevalence of heart disease: it was now the largest single cause of mortality in this country. The great peak in the curve of heart disease rose in the second decade of life, and then fell, and it corresponded exactly with the deaths from rheumatism and those from chorea. Dr. Dunn, of Boston, U.S.A., found that in acute cases of rheumatism and chorea the immediate mortality was 20 per cent., and within 10 years 50 per cent. Dr. Hope found that 2¼ per cent. of the New York children had serious heart disease, and Dr. Halstead, in the same city, found 2·3 per cent. actual cardiac cases in 44,000 children. In Berlin the percentage was given as 1·4. He, the speaker, had found among 5000 children that 10 per cent. were rheumatic, and 1·2 per cent. were declared to have organic heart disease, without taking into account the absentees, a very important omission. Cases in schools differed from those in hospitals in that they did not show many or severe signs of disease. A very large proportion of the cases complained of recurrent attacks of tonsillitis. The great cause of acquired valvular disease was rheumatism, in which he included chorea. He suggested that the efficiency of the heart under tests should be the diagnostic criterion. Heart muscle always gave way under stress before there was any appreciable effect on the skeletal muscles. He described the careful routine observed in New York in the case of children affected with heart disease, considerable attention being paid to the diet. Even severe cases sometimes recovered in an extraordinary way. Certainly the school age was the period when effort was likely to be most successful.

Discussion.

The PRESIDENT remarked that the death-rate in the schools for the physically defective was almost entirely among cardiac cases. He also commented on the adverse home circumstances of many cardiac cases and the poor comforts they received, which seemed to largely nullify other efforts.

Dr. F. C. SHRUBSALL spoke of the special prevalence of rheumatic and cardiac cases in damp localities, especially in the Lea Valley and around the bed of the Wandle. Some of the cases in the physically defective schools recovered sufficiently to return to normal school life. A test was needed for these cases, as the mere detection of murmurs did not afford a sufficient guide.

Miss JOSEPH, I.C.A.A., thought it would be economically sound to have lifts in elementary schools, and she made the point that cardiac cases sent from school to hospital should be seen by a heart specialist.

Dr. L. MANDEL spoke of the number of heart cases in which a sub-tonsillar abscess, or suppurating adenoids, and a nasal discharge had been found. In some Dr. Nabarro found a streptococcus resembling that isolated by Drs. Poynton and Payne.

Prof. LANGMEAD and Dr. BRANSON briefly replied.

MANCHESTER PATHOLOGICAL SOCIETY.

Exhibition of Specimens.

A LABORATORY meeting of this Society was held on June 14th, Mr. J. HOWSON RAY, the President, being in the chair.

Mr. GARNETT WRIGHT showed a series of specimens illustrating varieties of carcinoma of the rectum, and in addition a curious breast tumour for diagnosis.

Mr. H. PLATT showed three interesting bone tumours raising points of diagnosis and treatment. The use of Coley's fluid was discussed by the PRESIDENT, Mr. J. MORLEY, and Mr. PLATT, the last named stating his opinion that the majority of alleged cures by means of this fluid have been in cases of myeloma.

Dr. A. SELLERS presented a series of six specimens from the pathological laboratory of the Children's Hospital. One of these, after examination by members, was believed to be an intussusception of the appendix alone into the cæcum. It was discovered by Mr. G. B. Warburton on exploring a palpable tumour in the right iliac fossa of a child of 8 years. Resection was necessary. The specimen showed the appendix completely inverted within the cæcum. Other specimens shown were: bronchiectasis in a child, sarcomata of the small intestine and of the cæcum, and the spleen from a case of splenic anæmia.

Mr. F. H. DIGGLE showed a growth of the tonsil involving the larynx.

Mr. GEOFFREY JEFFERSON exhibited a histological section of a secondary carcinoma of the Gasserian ganglion. The primary growth was in the lung. The patient suffered from severe continuous facial neuralgia with hypoæsthesia, "anæsthesia dolorosa." The ganglion was explored, but nothing abnormal was detected at operation. At autopsy six weeks later it was seen to be slightly swollen, and section proved it to be infiltrated with carcinomatous cells.

Mr. MORLEY showed two specimens of intrathoracic goitre and an acute perforative diverticulitis of the pelvic colon. He also showed a very instructive specimen, the œsophagus and diaphragm from a case of cardiospasm, the patient dying from perforated duodenal ulcer. The œsophagus was widely dilated with thick muscular walls. Opposite the œsophageal opening in the diaphragm the gullet was strongly contracted. A histological section showed absence of fibrosis there. Mr. Morley thought that the crus of the diaphragm had not compressed the œsophagus, as the latter was not flattened but concentrically contracted.

In discussion, Mr. JEFFERSON described a somewhat similar case, secondary to ulceration in the duodenum, but in this case the œsophagus was not hypertrophied. Mr. DIGGLE spoke of his own observations, and those of his colleagues at Ancoats Hospital, on the part played by the diaphragmatic crus in these cases.

Reviews and Notices of Books.

RICKETS.

A Study of Economic Conditions and their Effects on the Health of the Nation. By J. LAWSON DICK, M.D., F.R.C.S.Eng., Deputy Commissioner of Medical Services, London Region, Ministry of Pensions. London: William Heinemann. 1922. In two parts, combined in one volume, freely illustrated. Pp. 488. 25*s*.

THIS book is remarkable in that it attempts to consider all questions and problems in the causation of rickets. The work is divided into two parts, dealing respectively with geographical distribution and symptoms, and with the natural history, ætiology, and treatment of the disease. Perhaps one of the most interesting chapters is that dealing with distribution, for, as the author sagely points out, answers to many questions of ætiology are here found. For instance, Eastern races are noted for their ignorance on the feeding of infants; consequently the child population suffers from severe epidemics of gastro-enteritis, and yet rickets is rare. Again, regions of overcrowding and general unhygienic surroundings can usually be found in rickety zones. The section on symptoms and morbid anatomy is full, and most of the illustrations are excellent, but perhaps a little too much space is devoted to the rarer clinical manifestations. There is a good account of deformities produced by the disease. Adolescent rickets and its bearing on flat-foot, scoliosis, and knock-knee are well described.

The various theories on ætiology are reviewed, prominence being given to the arguments for and against the vitamin deficiency theory. The author is frankly opposed to it, but at the same time gives a very fair account of Prof. E. Mellanby's work on the subject. Prof. Noel Paton's criticisms of the vitamin theory are described, and the pioneer work of Sir John Bland-Sutton is quoted at some length. Dr. Dick contends with some truth that "the vitamin theory is wholly inadequate as an explanation of the strong tendency which the young of all animals kept in captivity show to the development of spontaneous rickets," and obviously leans to the view that fresh air, sunshine, and good hygienic surroundings are the most important ætiological factors. The final section on treatment is directed almost entirely to public health measures, and little space is given to individual therapeutics.

The book is a fine compilation of the literature on rickets, both ancient and modern, with references for further study. Dr. Dick's excellent knowledge of the literature, combined with his own experience, has provided us with a volume full of interest and importance.

DISEASES OF WOMEN.

Second edition. By TEN TEACHERS. Edited by COMYNS BERKELEY, H. RUSSELL ANDREWS, and J. S. FAIRBAIRN. London: Edward Arnold and Co. 1922. Illustrated. Pp. 641. 30*s*.

THE editors have carefully revised the second edition of this deservedly popular text-book. A considerable number of minor additions and alterations have been made. In Chapter V. a good deal of additional matter has been added on the subjects of ovarian secretion, menstruation, and the menopause. In the sections dealing with displacements of the uterus anteversion and anteflexion have been entirely omitted in consonance with modern teaching, and we are glad to see that a description of the so-called acquired anteflexion is no longer to be found. The ambiguous term "fibrosis uteri" has also been deleted from the heading of Chapter XXVI. and the much more accurate designation "chronic metritis" retained. The recent work on the pathology of subinvolution and the differences between this condition and chronic metritis is fully described. The section on pelvic inflammation is placed at the head of the chapter on salpingitis instead of at the head of that dealing with pelvic peritonitis, a better arrangement; while we note with satisfaction that the use of the old and confusing terms "perimetritis" and "parametritis" has been given up. A useful table on the differential diagnosis of the various Gram-negative cocci has been added in the chapter dealing with gonorrhœa.

In view of the large amount of literature which has accumulated with regard to the X ray treatment of fibroids the description of this method is scanty and inadequate, while if the results claimed to have been attained by many observers in foreign clinics are at all reliable the pessimistic view taken by the editors of the treatment of carcinoma of the cervix by radium would hardly seem justified. Several of the drawings illustrating the sections dealing with corpus luteum cysts have wisely been omitted, since they gave undue prominence to a relatively unimportant condition; and a similar process of condensation and elision is to be found in the section dealing with connective-tissue tumours of the ovary. An illustration of the useful diagram published by Keith, of the parovarium and the ultimate fate of the neighbouring structures, is included and should prove helpful to the student. The selection of the figures to illustrate the sections dealing with gynæcological operations does not seem to have been very carefully made. Numerous illustrations are to be found of the operations practised on the external genitalia and the vagina, operations which are easy to demonstrate on the patient; while there is not a single illustration in the sections dealing with abdominal operations. These should surely be figured carefully, since they are so difficult to demonstrate, and even to describe.

On the whole, the book has been admirably revised and greatly improved. The editors are to be commended, inasmuch as in doing so they have avoided the common error of increasing its size.

Manual of Diseases of Women. Second edition. By W. E. FOTHERGILL, M.A., B.Sc., M.D., Professor of Obstetrics and Gynæcology in the Victoria University of Manchester. Edinburgh: W. Green and Co. 1922. With 149 illustrations in the text. Pp. 433. 10*s*.

WHEN the first edition of this work appeared its arrangement on a pathological basis of classification was a new departure. Since that time this method of arrangement has met with considerable favour and has been adopted by a number of other authors. Without doubt it has a great deal to recommend it, and the present tendency to associate the teaching of pathology with that of anatomy and physiology before the student enters on his more strictly clinical studies is all in its favour. It is of the utmost importance that students should recognise that the ordinary facts of general pathology are entirely applicable to the subject of gynæcology, and should no longer be obsessed with the idea that the pathology of the female pelvic organs is something quite different from that of the pathology of the body as a whole. This book contains in almost every chapter sound and valuable teaching, and is characterised by a careful avoidance of any statement that cannot be substantiated by careful observation on the part of the reader. It is singularly free from ill-conceived theories and is characterised by a robust conservatism. One of the commonest conditions in the ordinary gynæcological patient is that of prolapse of the uterus and vagina; the section dealing with this condition is particularly well written and the treatment advised thoroughly good. An interesting appendix is given which deals with the results obtained by the author in the treatment of the varying forms of prolapse of the uterus by anterior colporrhaphy combined with amputation of the cervix as a single operation, and with the use of the combined operations of anterior and posterior colporrhaphy in the

treatment of these cases. Prof. Fothergill quotes his results and shows that by the use of vaginal surgery alone it is possible to cure some 97 per cent. of the cases by an operation that is efficient and permanent, does not prevent pregnancy, and stands the test of subsequent parturition in the majority of cases. The advantages of the pathological classification is particularly well seen in the part of the book dealing with the various results of infection, containing as it does sections on the vaginal barrier against infection, the curative process of inflammation, and finally consideration of the various forms of infection and their results upon the pelvic organs.

A good book, which can be thoroughly recommended to the student and practitioner as a safe guide to them in their study of the diseases of women.

CLINICAL EXAMINATION OF SURGICAL CASES.

By J. RENFREW WHITE, M.B., F.R.C.S. Eng., Assistant Surgeon and Surgeon-in-Charge of the Orthopædic Department, Dunedin Hospital; Tutor in Surgery, Otago Medical School. Dunedin: J. Wilkie and Co., Ltd. 1922. Pp. 129.

THE growing tendency among students to rely on laboratory methods for a diagnosis to the partial exclusion of the clinical examination of the patient is becoming noticeable to teachers of clinical surgery. When this occurs the result is not likely to be happy, for though the few may obtain facilities for elaborate methods, the majority go into practice where reputation and livelihood depend on clinical ability. A book, therefore, wherein detailed methods of clinical observation and examination are well taught cannot be but warmly welcome. In most medical schools a handbook of this sort is in use among students, but none so exhaustive as the volume under review.

The methods described under many headings are admirable, and at the end of each section there is a brief résumé of the commoner diseases seen in the part of the body under discussion. In one or two particulars there is room for improvement, the fault in every instance being that a preliminary knowledge of methods of examination is presumed. For example, in the sections on Diseases and Injuries of the Hip-Joint, instructions are given that Nélaton's line and Bryant's triangle should be mapped out, but no details are given, and the student confronted with cases of hip diseases for the first time will hardly know how to proceed. Again, advice is given tersely that the limb is to be measured from one point to another, but no mention is made of the difference between true and false shortening or lengthening, nor is any warning given as to the fallacies which may arise from tilting of the pelvis.

However, the book in most respects is excellent, and if the instructions given are faithfully followed, habits of close observation and detailed examination will be formed which will stand the practitioner in good stead in the days to come.

HISTORY OF AUSTRALIA IN THE WAR.

The Official History of Australia in the War of 1914–1918. Vol. I., The Story of Anzac, the First Phase, from the Outbreak of War to the End of the First Phase of the Gallipoli Campaign, May 4th, 1915. By C. E. W. BEAN. Sydney: Angus and Robertson, Ltd. Pp. 660. 21*s*.

THIS is the first volume of the official history of Australia in the war, the whole work being planned to extend to 12 volumes; if the remaining volumes are as good as the one before us the official history will rank with Napier's immortal book as one of the really great war histories. Mr. Bean, though probably known to every Australian, is not so well known in this country, and we trust that his modesty in saying nothing about himself, will not take umbrage if we mention that he is a barrister and journalist, that he was official correspondent with the Australian Force 1914–1918, and that he is official historian of the war for the Australian Government.

No one will read without a feeling of pride and thankfulness Mr. Bean's opening chapters wherein he shows in what a spirit Australia, of course including New Zealand, decided upon entering the war, how they offered men, money, and service of every kind, how the war was looked upon as a crusade and entered on in the ideal crusading spirit, which differed markedly from the actual, as many mediæval chroniclers show. The same feelings, of course, were apparent in other parts of the Empire, but the war brought about in Australia for the first time a unity of "all the States in the Commonwealth and of all sections in those States." Mr. Bean's account of how the Australian Imperial Force was organised, of the sailing of the first contingent, of the voyage to Egypt and the incident of the *Emden* on the way, is narrated with a wonderful vigour and restraint, which keeps the reader in breathless expectancy. Then follows a description of the strenuous training in the desert, and the breaking of the Turkish expedition against Egypt. In Chapter IX. Mr. Bean describes the Dardanelles expedition; to Australia and New Zealand the cost of the landing was 9000 men, of whom at least 2500 were killed. Gallant deeds were done by these and their colleagues in sight of the plains of Troy and all who fought in Gallipoli may well echo the words of Glaucus: "He sent me to Troy and bade me very instantly to be ever the best and to excel all other men, nor to put to shame the lineage of my fathers." Mistakes and errors there doubtless were, as in all human undertakings, and from the medical point of view the most important of these was the breakdown of the medical arrangements on the line of communications. This is fully dealt with by Mr. Bean in his XXVth chapter. The blame lay with the higher authorities, for the work of the field medical staffs and the stretcher bearers was beyond all praise. It is pleasant to note that Mr. Bean speaks of the hospital of the *kindly* German nuns at Alexandria, for kindliness to the wounded was not the leading note during the war.

The book is copiously illustrated, there are a number of maps and plans, and there is a most excellent index.

EMIL COUÉ:

The Man and His Work. By HUGH MACNAGHTEN, Vice-Provost of Eton College; sometime Fellow of Trinity College, Cambridge. London: Methuen and Co. 1922. Pp. 52. 2*s*.

THIS little book provides a case study from the recent epidemic. The author was relieved of insomnia, and the fervour of his adoration for the healer is almost religious. Mr. Coué, by satisfying some emotional need in this particular patient, set in action a mental process which resulted in relief of the psychoneurotic symptom. If every grateful patient of Mr. Coué gave testimony with equal fullness we should better understand what varied influences and processes are concealed by the use of the word "auto-suggestion."

COMPARATIVE ANATOMY.

Laboratory Manual for Comparative Vertebrate Anatomy. By LIBBIE H. HYMAN, Department of Zoology, University of Chicago. Chicago: University Press. 1921. Pp. 380.

THIS is an excellent book. It was written to furnish a guide for the medical student in his early years, when he is pursuing biological researches, and when comparative anatomy and morphology are being instilled into him in order that he may gain a better understanding of the human body. The author has brought much information into a comparatively small space, has not sacrificed clearness to brevity, and has nowhere lost sight of the practical nature of the instruction he is giving. There is more in the book than it is necessary for the medical student to know;

but that is no fault, for the "minimum" standard of teaching is as objectionable as the compressed tablet variety. The author's disregard of the general terms used in human anatomy—we are not referring to the B.N.A., or other system—is therefore a matter for approval. Some of the terms used for special structures are not those commonly used in this country, but this is of little importance: what will, no doubt, interfere with its use here is the fact that the common animals of laboratory value in America are not those easily obtained in this country, and the book is written round these animals. It is a pleasure to read the book, which, so far as we have tested it, appears full of accurate and reliable information, and is thoroughly well illustrated.

ORGANIC ANALYSIS.

Qualitative and Quantitative. By E. DE BARRY BARNETT, B.Sc., F.I.C., and P. C. L. THORNE, M.A., A.I.C. London: University of London Press. 1921. Pp. 168. 7*s.* 6*d.*

THIS volume is intended to serve as companion to the various works on the organic compounds in general use, and should prove useful to those reading for a degree. Instead of providing a scheme which will serve to identify organic compounds, the authors adopt the more logical method of laying stress on the detection of groups by systematic tests and the completion of the identification by the preparation of derivatives, or by the estimation of some group or element present. Although a number of constants, such as melting-points and boiling-points, of the more common organic substances are included in the book, they are by no means exhaustive, and the student is led to the admirable practice of looking up the properties of other compounds in the literature. Part I. is qualitative in character, and is concerned with physical properties, detection of elements. Part II. (quantitative) deals with ultimate analysis, molecular weights, and the estimation of groups and of individual substances. The work, which is well illustrated, concludes with a lucid description of the Richter system of indexing organic compounds.

The authors are to be congratulated on having produced a really useful and sound work.

LEGAL HANDBOOKS.

How to Appeal against your Rates (in the Metropolis). With Forms and Full Instructions by A. D. LAWRIE, M.A., of the South-Eastern Circuit, Barrister-at-Law, Joint Editor of "The Union Assessment Committee Acts," &c. Fifth edition, revised by GEORGE FREDERICK EMERY, LL.M., of the South-Eastern Circuit, Barrister-at-Law, Author of "The Income Tax Acts as they Affect the Public," &c. 1922. London: Effingham Wilson. Pp. 154. 2*s.* 6*d.*

County Court Practice Made Easy, or Debt Collection Simplified. By a Solicitor. Fifth (revised) edition. 1922. Same publishers. Pp. 162. 4*s.*

THESE two small legal handbooks, each of which has already passed through four editions, are designed for the guidance of laymen, as well as lawyers, in matters in which every man may have to act to some extent as his own legal adviser.

The rise of rates affects most of us, whether we pay them directly or indirectly, and all should note Mr. Emery's suggestion that the safety of loans secured by the rates should not tempt those who subscribe to them to neglect the duty of urging economy upon their local authorities. Only those actually assessed are of course immediately interested in "How to Appeal," and these will gain a good deal of useful information from the small volume under review, although if it comes to actual appeal, they will do well to seek expert legal advice. The handbook which has just been re-issued refers, it will be observed, to London only. Assessments outside the metropolis have been dealt with by the same author in a work which is already in its sixth edition.

"County Court Practice Made Easy" has been expressly designed for the use of those who, whatever the nature of debts owing to them, may wish to enforce them by county court proceedings in cases where the sum to be recovered is so small that it would not be worth while to have professional assistance. Legal aid is not necessary in order to prove a debt before a county court judge, but the formalities before that stage is reached are puzzling to one who does not "know the ropes." This well-tried manual explains in simple terms all that it is necessary for the would-be litigant to know as to the "procedure." It does not profess to deal with the legal aspects of the claims likely to be made by medical men or any other class of creditor.

THE INTERPRETATION OF RADIOGRAMS OF VESSELS.

Étude Anatomo-Radiologique des Vaisseaux de la Base du Cœur, vus de Face. By Dr. ROBERT CHAPERON, Assistant de Radiologie des Hôpitaux. Paris: Masson et Cie. 1921. Pp. 61. Fr.6.

IN this little book are given the results obtained in an investigation carried on at the Central Laboratory for Radiology in the Hospital of La Pitié, the object of the study being to obtain data for correct interpretation of the normal shadow lying in, and especially above, the cardiac region. Writers have not been in accord in the values given to different portions of the borders of this shadow, nor even in their ideas as to the main vessels concerned in making them: thus some would deny that the vena cava has anything to do with the right border, some do not seem to admit the left auricle in the left border, and these differences of interpretation, with others of similar sort, naturally become exaggerated when dealing with abnormal shadows. The present work was done on the cadaver, subjects being of various ages and carefully prepared. The conclusions to which the investigation led will in general, we think, be acceptable to British radiologists, although results obtained by injection of the dead body are to be applied cautiously when dealing with the limitations of the living. The subject of thoracic shadows is one on which much work yet remains to be done. This record is a contribution of considerable value to the interpretation of mediastinal figures from the standpoint of the normal.

JOURNALS.

SURGERY, GYNECOLOGY, AND OBSTETRICS with International Abstract of Surgery. (Baillière, Tindall, and Cox. £3 15*s.* per annum.)—It is universally agreed that to keep abreast of developments in all branches of surgery is well-nigh an impossibility, and to do so even in one subject only is to tax the time and resources of most men too far. Several medical periodicals contain abstracts of current literature of the various branches of the profession, but in none except *Medical Science Abstracts and Reviews* (Oxford University Press. £1 10*s.* per annum), which subserves this function only, is this section elaborated to such an extent as in *Surgery, Gynecology, and Obstetrics*, the official journal of the American College of Surgeons, which is published monthly. Each number includes an International Abstract of Surgery, which contains abstracts from the current literature of all countries. It is admirably arranged under five main groups—viz., General Surgery, Obstetrics, Gynæcology, Genito-Urinary Surgery, and that of the Ear, Nose, and Throat. The first group is dealt with regionally, and ends with miscellaneous subjects such as radiology. The whole takes up 80 to 100 pages of each issue into which is crowded an enormous amount of information. The abstracts are short, but lucid, and in some papers of exceptional interest illustrations are reproduced. An index of titles and authors' names is included, also an extensive bibliography of current literature, containing the references of many papers not summarised. In the June issue the index comprises the last six monthly issues.

AMERICAN JOURNAL OF OPHTHALMOLOGY. May, 1922.—H. V. Würdemann: Retinitis Proliferans. Two cases, both non-traumatic, are recorded and illustrated by coloured plates. In one of them the condition was secondary to diabetes. It is the opinion of the author that laboratory studies would often show diabetes in these cases, and that there is always a change in the blood which promotes extreme coagulability, which is the reason for the slow absorption and subsequent organisation into connective tissue.—Two articles proceed from the Medical Research Laboratory and School for Flight Surgeons, Mitchell Field, Long Island. The first, by Major L. E. Tefft and Elizabeth K. Stark, deals with speed of accommodation as a practicable test for fliers, but concludes that since the other tests disqualify the majority of cases with slow speed of accommodation, it is not necessary to establish a disqualifying limit for speed of accommodation. The second paper, by Barbara V. Deyo, gives statistics showing the amount of superiority in the judgment of distance possessed by those with binocular over those with monocular vision. For accurate depth-perception judgment good binocular vision is necessary, and the results of these tests show that the better the visual acuity, the more exact the depth-perception judgment tends to be. —Three articles are concerned with the causation of chronic glaucoma. John Dunn believes that the most important factor is swelling of the vitreous body, but he fails either to discuss alternative theories or to bring any but purely speculative evidence in support of his view. In another article Otto Wipper attacks the problem of what is the cause of glaucoma in those cases where cupping of the disc appears without any demonstrable rise of tension. He explains it by supposing that the essential cause of glaucoma is a ciliary neuritis, and that the optic-nerve atrophy and the cupping are mainly the result of the inflammatory process, and only in a lesser degree due to increased tension. The third article, by Thomas Faith, is of a clinical nature, recording four cases of secondary glaucoma relieved by atropine. These cases are not very uncommon and are sometimes such as to puzzle the most experienced ophthalmic surgeon. Even in cases where the increase of tension is undoubtedly due to cyclitis it may often be difficult to decide between treatment by mydriatics or miotics, and, as the author justly remarks, the ordinary text-books fail to point this out.—The remaining articles include a clear exposition of the angles "alpha," "gamma," and "kappa," by E. Landolt, which may be commended to candidates for any of the higher diplomas in ophthalmology, and a clinical article on Glioma of the Retina, by M. J. Keys.

ANNALS OF MEDICAL HISTORY. March, 1922. New York: Paul B. Hoeber. Pp. 113. $2.50.—The main feature of this number, which appears with an apology from the publisher for belated appearance in May, is a long and excellent article by Dr. Knud Faber, Professor of Internal Medicine in the University of Copenhagen, entitled Nosography in Modern Internal Medicine. Nosography, la méthode nosologique ou nosographique, as Charcot called it, is the methodical and descriptive classification of diseases, founded upon the thorough observation of patients and the examination, by accurate methods of the morbid phenomena which they exhibited during life, together with the demonstration post mortem of the underlying lesions. Prof. Faber traces the growth of this system throughout some 300 years from the time of Sydenham down to to-day, as exhibited in the various European countries.—Another interesting paper is that dealing with the career of Caspar Wistar, Junior, by Dr. W. S. Middleton. Wistar, who was born in Philadelphia in 1761, studied medicine in that city and also in Edinburgh and London. He eventually became physician to the Philadelphia Hospital, remaining at his post throughout the yellow fever epidemic of 1793, himself contracting the disease. He was a good anatomist and published his "System of Anatomy" in 1811, the first American text-book on the subject. Wistar is most widely known neither as anatomist nor physician, but as the man after whom was named the beautiful climbing plant *Wistaria speciosa*, although the botanist Nuttall, who gave the name to the plant, wrote it as "Wisteria."—Dr. J. C. da Costa writes upon the French School of Surgery under Louis Philippe when Paris could boast of such names as Larrey, Dupuytren, Lisfranc, Nélaton, and Velpeau, a portrait of the last of whom forms the frontispiece to the number before us.—Dr. Jacob Rosenbloom contributes a valuable little paper on the History of Pulse-Timing, with special reference to Sir John Floyer and his pulse watch. Herophilus, of Alexandria, used a water clock for pulse-timing, and Dr. Rosenbloom might have added that down to the beginning of the nineteenth century a very small sand-glass, which only ran for one minute, was in common use.

NATIONAL MEDICAL WORLD OF CHINA. Vol. VIII., No. 1. March, 1922.—This number of the official organ of the National Medical Association of China contains 69 pages of English reading-matter, which includes an account of the Fourth Conference of the Association at Shanghai in February, to which reference is made by a correspondent on p. 37. Dr. C. Voonping Yui, one of the editors of the journal, contributes a summary of an address describing the work of the Scientific Terminology Association, which has been at work for seven years and has fixed over 10,000 Chinese medical terms, which the medical colleges of China are urged to adopt without delay. The other original articles are:—Trachoma in China (T. M. Li, Peking); the Present Status of the Cancer Problem (J. Heng Liu); the Bacterial Diagnosis of Cholera (E. T. H. Tsen, Peking); the Present Day Dietary Standards (B. E. Reed, Peking); and "A Case of Ovarian Cyst" (J. W. H. Chun). A summary of the ninth annual report of the North Manchurian Plague Prevention Service is contributed by Dr. Wu Lien Teh, director and chief medical officer of the service.

New Inventions.

A SIMPLE PORTABLE APPARATUS FOR CONTINUOUS OXYGEN ADMINISTRATION.

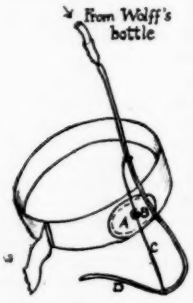
FOR many years oxygen has been largely used in the treatment of pneumonia; it is generally given sporadically, and rather with the idea of meeting some crisis in the patient's condition. Its use as a continuous therapeutic agent came under the writer's especial consideration in the treatment of severe cases of broncho-pneumonia, complicating pertussis and measles, in the wards of the infectious block of the East London Hospital for Children. Dyspnœa and cyanosis were, of course, predominant symptoms in many cases, and the lack of proper oxygenation of the blood appeared to be a serious, often a fatal handicap to recovery. Physiological, pathological, and chemical work upon the oxygenation of the blood also points in the direction hinted at by these clinical signs. The vicious circle produced by oxygen-lack—dulling of the activity of the respiratory centre, diminution in amplitude and frequency of respiration, and consequent further oxygen starvation—has been now completely worked out. Pneumonia is certainly a condition in which there is often anoxæmia; the position of oxygen therefore in its treatment should be one rather of regular use than of spasmodic effort. The same is true of other conditions, complicated by lack of oxygen, such as chronic bronchitis and emphysema, asthma, and many types of heart disease.

In the cases of broncho-pneumonia above referred to oxygen was given at first by the usual funnel method. This, however, suffers from many disadvantages. The presence of a nurse is necessary. Much oxygen is wasted owing to rapid diffusibility. It is doubtful whether the inspired air has a much raised oxygen tension. The presence of a large funnel in close proximity to the face is often resented by a

restless patient. These are all difficulties which it is essential to overcome in the production of an apparatus which will usefully administer oxygen. An oxygen chamber is, of course, ideal, for the oxygen tension can be exactly regulated. It is a luxury, however, which is restricted to a few institutions of sufficient wealth, and even in them it can only be used in a small proportion of cases; the lesser hospitals and the private practitioner must look elsewhere.

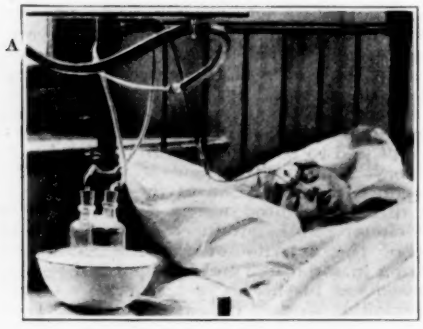
Description of Apparatus.—The illustration and diagram are nearly sufficiently explanatory of the apparatus which forms the subject of the present communication. A webbing or elastic circlet, whose size can be regulated by a buckle, grips the head firmly but not tightly (see Fig. 1). On the front of this is an aluminium plate (A) which acts as a firm base for the brass pin (B). Through a vertical hole in this passes an aluminium rod (C) which can be fixed at any level by a screw. Loops at the extremities of this hold a rubber catheter, size 6 (D); they grip it but allow it to be pulled through to any desired length. Oxygen passes from the cylinder through a Wolff's bottle (see Fig. 2) containing fluid (water or brandy), and standing in a bowl holding warm water. From this it passes to the patient who receives it intranasally through the rubber catheter.

FIG. 1.



Method of Use.—Attention to a few details is necessary when fitting the apparatus to a patient. The catheter must first be lubricated; the best ointment for this has been found to be novocain 1 per cent. in vaseline. It should be inserted to the level of the posterior nares, or a little beyond, but must not touch the posterior pharyngeal wall. If a thread be tied round the catheter to mark the depth to which it is desired to introduce this, a nurse can easily see whether any slipping has occurred and can quickly and accurately readjust it. The lower loop in the aluminium wire should be as near the nostril as possible. The rubber tube to which the catheter is attached can be suspended, in which case the movements of the patient's head are quite unrestricted. The rate of flow of oxygen can be seen by the rapidity

FIG. 2.



A = tube from oxygen cylinder.

of the bubbles through the brandy or the water in the Wolff's bottle. The speed need be no faster than about 70–80 bubbles per minute. Oxygenation is efficient at a much slower rate of flow than with an open funnel.

Mechanical Advantages.—The apparatus is stable; since it moves with each movement of the head the patient is not worried, and soon becomes reconciled to it, eventually forgetting its presence. It is very light and portable. Oxygen is conducted to a position whence much of it is inspired; thus there is actually a very considerable saving in the amount of oxygen used. It is inexpensive.

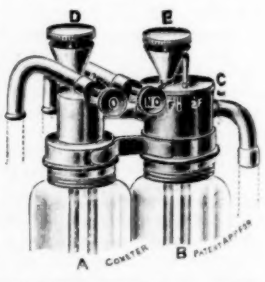
Clinical Advantages.—It has been used in 23 cases of severe broncho-pneumonia in children. Cyanosis is not seen in cases using it. Sleep is not interfered with. There is no increase in the number of paroxysms in cases of broncho-pneumonia in pertussis; thus there is no local irritation from its presence. Other signs of irritation or resentment are not seen as a rule, although occasionally it has been found necessary to tie the hands down. Oxygen can be given continuously and indefinitely in an effective and economical manner. There appears to be no reason why its use should be restricted to children; they provide the more searching test, and success with them should promise at least an equal success in adult cases. It should prove of use in any pulmonary or cardiac condition complicated by anoxæmia and cyanosis.

The instrument is made by Messrs. Maw, Son & Sons, who have agreed that all proceeds of its sale should go to the East London Hospital for Children.

Harley-street, W. GEOFFREY BOURNE, M.D. Lond.

A NITROUS OXIDE-OXYGEN-ETHER APPARATUS.

THE nitrous oxide-oxygen-ether apparatus described below has been designed with the object of obtaining easy and smooth adjustments, while reducing to a minimum the distraction of the anæsthetist's attention from the patient. In order to facilitate this all the controls are placed close together. The gas and oxygen streams are controlled at the cylinder valves by automatic regulators, with which, by varying degrees of throttling, a flow of gas at any rate can be obtained. The construction of the ether bottle enables ether vapour of a constant but easily varied strength to be added to the gases. The cylinders screw into a light tubular stand, which takes to pieces for carrying. In the larger hospital model they are placed upright on a trolley, provided with castors. The valve-taps are turned full on, and the gases led into the automatic regulators. A small vertical arm carries the gas feed and ether bottle, which are coupled together and form one unit. The sight-feed (A), shown in the illustration, is connected with the automatic regulators by means of rubber tubes, and the flow of the gases through it is controlled by two needle valves (O and NO), placed side by side on top of the feed. With this feed it is impossible for the water to be blown out by a sudden rush of gas. The ether bottle (B) has a regulating stopcock (C), operated by a rotating top. Three tubes project down into the bottle; one, which is short, is closed at its end, and has holes round the side from which the gases emerge, another reaches halfway down the bottle and blows the gases directly on to the surface of the ether, and the third allows the gases to bubble through the ether. With the indicator (F) at "Off" the gases pass straight on without any part of them entering the bottle. By rotating the stopcock, any proportions of the gases may be directed into the bottle through the first, second, or third tube as desired. The bottle and sight-feed are easily filled through large funnels (D and E). With a slow flow of gas (3 to 4 holes) it is not necessary to heat the gas cylinder head; but when a greater stream is necessary it is best to use a small lamp to ensure a steady flow.



The wholesale makers are Messrs. Coxeter and Son, Pancras-road, London, N.W. 1.

STANLEY ROWBOTHAM, M.R.C.S., &c.
Queen's Hospital, Sidcup, Kent.

THE LANCET.

LONDON: SATURDAY, JULY 1, 1922.

Quarantine Measures in the Near East.

A DOCUMENT has just been issued by the League of Nations which should have considerable influence in determining the settlement of a number of thorny questions relating to so-called "quarantine" in the Near East and the future of international measures for the prevention of epidemics. Before the war Constantinople and the ports of the Levant, the Red Sea, and the Persian Gulf were for sanitary purposes under the control of two authorities more or less international in character—namely, the Quarantine Board of Egypt and the Board of Health of Constantinople. The activities of these two authorities were determined largely by international agreements, and extended to the measures taken to control the introduction and dissemination of infection by the annual pilgrimage to Mecca. The Constantinople Board of Health, primarily an Ottoman institution, has now for practical purposes disappeared, and the larger part of the territories and ports which used to be Turkish have passed into other hands. As a result, the measures in the Near Eastern waters to control the importation of infectious disease are now taken by a very large number of different authorities in one capacity or another—by Britain and France in Palestine and Syria, by Greece in Smyrna, by the Inter-Allied Commission in Constantinople, by Kemalist officers in Asiatic Turkey, by the King of the Hedjaz in Arabia, and so forth. This results in action being applied to ships and passengers which is frequently capricious and taken without regard to what has been done perhaps the day before in previous ports. The want of cohesion is shown equally in connexion with the sanitary control of the Mecca pilgrimage. Notwithstanding the systematic medical examination and observation of pilgrims which takes place at the quarantine station at either end of the Red Sea, El Tor in the north and Kameran in the south, the present King of the Hedjaz applies to pilgrims and pilgrim ships, under the name of sanitary measures, a number of vexatious proceedings, when they arrive at Jeddah, which, in the absence of proper sanitary equipment, are of no value as a means of preventing the introduction and spread of epidemic diseases. All this post-war multiplication of port sanitary and quarantine authorities might be of little practical consequence if their action was governed by a general international agreement; but, unfortunately, as is well known, the International Sanitary Convention applicable to these matters is so out of date and so dependent on pre-war conditions which no longer exist that it fails to govern practice.

The health organisation of the League of Nations, in consultation with the Office International d'Hygiène Publique of Paris, which has special duties in regard to sanitary conventions, in the above circumstances sent a small International Commission of public health experts to report on the existing conditions and future requirements of the chief Near Eastern ports in order to find a basis on which the present International Sanitary Convention can be revised. The Commission started its work with the advantage of having settled for it a new code of quarantine measures for the future which has been recommended by the Office International d'Hygiène Publique for general application in the civilised countries of the world. Its task was to see what specific additions should be made to these proposals to meet the circumstances of the Near Eastern ports, the Straits of Constantinople, and the Suez Canal. We refer elsewhere in this issue to the recommendations which it makes for this purpose. They are on practical and even conservative lines. The good work of the Quarantine Board of Egypt is recognised, and its continuance is advised as the international sanitary authority to deal with infectious disease in the Suez Canal, Egyptian ports, and the northern section of the sanitary control of the Mecca pilgrimage. The other stations for pilgrims—particularly that at present existing on the island of Kamaran and that which will need to be set up on the Hedjaz railway when that route to Mecca is reopened—should coördinate their work with the Egyptian Quarantine Board under the direction of the League of Nations. The Commission does not recommend that exceptional provisions should be made for Syria and Palestine in view of the striking evidence of the progress of public health measures in those countries since the war and of the promising development of new sanitary services at ports like Haifa and Beyrout. For Constantinople, however, it is considered that the problem requires an international solution, and the Commission draws attention to the special risks of importation of infection from Black Sea ports at the present time which result from the epidemics of Russia. If it is important in European interests to take special precautions against ship-borne infection from eastern countries being carried through the Suez Canal, it is in present circumstances at least as necessary to do the same in the Bosphorus with regard to arrivals from ports like Rostov and Odessa where typhus, small-pox, and cholera are freely epidemic.

It is to be hoped that the League of Nations will now go further and press the Governments concerned to put these important recommendations into effect at an early date. It is necessary at the same time to conclude whatever formalities are still required to complete the much overdue revision of the general provisions of the International Sanitary Convention of 1912. The latter document, like its predecessors, originated from considerations of commerce quite as much as of hygiene, and in older days the interests of the two were considered essentially antagonistic. These days, however, are past. The aim of progressive preventive medicine is to apply new knowledge of epidemiology in such a way as to facilitate communications and transport, and impose only those measures of restraint and delay which are justified and required in the interests of public safety.

The Genesis of Laughter.

THE scientific conception of "instincts" has enabled us to describe human actions under general formulæ, and thus the conception is justified. There is an innate tendency in men and animals to pay attention to objects of a particular kind, to experience an emotion of a peculiar quality thereupon, and to act in a particular way in regard to those objects. This tendency is an instinct, and in his "Introduction to Social Psychology" Prof. WILLIAM MCDOUGALL, now of Harvard, has formulated a description of

man's social behaviour based upon certain primary instincts. Of these flight, pugnacity, curiosity, and the parental instinct are examples, and in them we can discern mental processes common to animals and man and necessary for the survival of the individual or the race. But laughter, one of the commonest of human reactions, has hitherto defied description in terms of instinct; unlike the pure instincts, it does not manifest itself in animals other than man and it serves no obvious biological need. Yet proverbs and popular conceptions indicate definite qualities belonging to laughter. "Laugh and grow fat" suggests that laughter is physically good for man; "He laughs best who laughs last" contains a warning to express cautiously the feeling of superiority to our fellows in their misfortunes; the risus sardonicus is not primarily a clinical sign, but marks the villain of melodrama; and "The loud laugh that speaks the vacant mind" indicates GOLDSMITH'S acceptance of the view that ready laughter is no sign of a well-stored intellect. The varieties of laughter described as giggle, snigger, or cachinnation, appear to carry something condemnatory, and altogether the laugh seems to stand in need of defence.

There have been various theories of laughter and the ludicrous, from ARISTOTLE to FREUD, and in the current quarterly number of *Psyche* Prof. MCDOUGALL takes up recent views, particularly that of Mr. MAX EASTMAN, who, in "The Sense of Humour,"[1] proposes that laughter is the expression of an instinct as specific as those which find expression in fear and anger; but, according to MCDOUGALL, he fails to explain what is the essential nature of the ludicrous and what biological service is performed by laughter. The ludicrous consists in the discomfiture, usually unexpected, of our fellow men, and philosophers have deduced a theory of pure malevolence—that it is the nature of man to rejoice at the misfortunes and defects of his fellows—or a theory that we laugh from the pleasureable thought that we are immune from such tribulations. As MCDOUGALL says, these theories imply a dark view of human nature, and he propounds one much more flattering to our moral self-appraisement. It is a generally recognised fact that expressions of feelings in our fellow men tend to throw us into similar states of feeling, and in virtue of this fundamental principle we all tend to share the emotions and pains of our fellows. If, however, we always responded to minor mishaps in others by feelings of sympathy, and suffered all the minor pains of our fellow men, we should be constantly subjected to depressing influences entailing a lowering of our own vitality; by using laughter as a defence we arrest the train of disturbing thought and benefit by the pleasing bodily stimulation. Laughter, MCDOUGALL suggests, is an instinctive reaction of aberrant type. The objects which primarily excite this instinct are such actions, situations, and aspects of human beings as would excite in us some sympathetic pain or distress, if we did not laugh. Thus there is an instinctive tendency towards sympathy and a secondary tendency to laughter as a defence against the pain of sympathy. If we accept this view we need no longer be ashamed of laughing when sympathy is due, and the hypersensitive among us who fear the pitying smile or the derisive laugh may take courage and read into them the sympathy of our fellows. Nevertheless it is hard to believe that the man who laughs most easily at the misfortunes of others would feel the most sympathy if he did not laugh.

[1] Charles Scribner and Sons, New York, 1921.

Prof. MCDOUGALL has arrived at a *modified* conception of the ambivalency of feeling, the tendency to react emotionally in opposite ways to the same stimulus, as expressed by the phrase which he repeats, "Laughter is akin to tears," or by the idea that love and hatred are akin, or by the psycho-analytical claim that fear and desire arise from an identical impulse. A *full* conception of ambivalence could accept the theory of pure malevolence, masked indeed by the social sentiment which only allows the evil in us to appear, in a disguised and comparatively harmless form, as laughter. The behaviour of mankind in these days does not encourage us to reject theories simply because they imply a dark view of human nature; but if we do allow ourselves to be influenced in our psychological theories by what we should like to believe we might just as well be really optimistic and picture the laugh as a satisfactory and pleasure-producing defence against the evil that is in us. Then we can laugh ourselves and, thankful that good comes out of evil, have understanding of others when the laugh goes against us.

The Causation of Fœtal Death.

UNTIL a comparatively recent date, and notwithstanding the brilliant lead given by BALLANTYNE, of Edinburgh, the subject of fœtal death, popularly known as "stillbirth," has attracted little attention from obstetricians and pathologists. The stillbirth rate for this country has stood for many years at about 3 per cent., representing an annual waste of an immense number of lives; and when to this is added the considerable number of neo-natal deaths from obstetrical causes, the long list attains a still greater magnitude and becomes more than ever a thing of national importance. The neglect of the problem of stillbirth is only a part of the strange neglect that obstetrics has had to struggle against for many years. In no other branch of medicine is the standard of teaching so inadequate; not that the teachers themselves are to blame, for they have always fought hard for a better system of practical instruction in the medical schools. During the past few years obstetrics has begun to ascend into its proper position amongst the sister branches. The prevention of fœtal death is one of the chief aims of the preventive side of obstetrics. But before the fœtal death-rate can be diminished its causes must be found, and it was with this object in view that Mr. EARDLEY HOLLAND, in 1914, began an investigation, the results of which are embodied in a report.[1] The work was begun under the auspices of the Local Government Board, whose chief medical officer, Sir ARTHUR NEWSHOLME, had long realised the importance of the subject, but publication has been considerably delayed for several reasons, among others the war and the death of Mr. HOLLAND'S collaborator, the late Dr. P. B. RIDGE. The report is prefaced by an admirable introduction by Sir GEORGE NEWMAN, who emphasises the need of improved instruction in obstetrics, especially of clinical teaching, in fundamental principles by senior teachers; the provision of more maternity beds in the teaching hospitals is a corollary of this need. Mr. HOLLAND'S report represents an immense amount of careful pathological work and the conclusions he draws can hardly fail to modify in certain directions the practice and teaching of obstetrics. The investigation consisted in the detailed examination of 300 cases of stillbirth, the plan of which fell under four heads: (1) the mother, (2) the father, (3) the fœtus, and (4) the placenta. Printed blank forms, reproduced in the report, and now adopted by the Medical Research Council for the use of their workers at present engaged in the same field of research, were used for recording

[1] Ministry of Health Reports on Public Health and Medical Subjects, No. 7: On the Causation of Fœtal Death. By Eardley Holland, M.D., F.R.C.P., F.R.C.S. 10s. net.

details under each of these headings. Mr. HOLLAND took care to make his sample of 300 fœtuses a mixed one, representative of several districts and of both the in- and out-patient practice of several institutions; for, as he points out, the incidence of syphilis is higher in some districts than in others, and in-patients, often admitted for severe complications in labour, naturally yield a higher proportion of dead fœtuses than do out-patients.

Among the actual causes of death special reference may be made to syphilis and excessive cranial stress, the first because of its low incidence and the second because of its unexpected importance. The Royal Commission on Venereal Diseases, unable to obtain much information on the relationship of syphilis to fœtal death, had to rely upon indirect evidence, and as a result was led to give great prominence to syphilis as a cause of stillbirth. Mr. HOLLAND, on the other hand, has found a relatively small percentage of deaths which he could attribute to syphilis. The examinations were thorough and precise; yet among the 300 fœtuses there were only 42 cases of proven syphilis and 6 of "probable" syphilis (or 16 per cent. in all) in addition to 14 cases of "possible" syphilis. Prof. H. TURNBULL'S work on congenital syphilis of the long bones, on which some of the conclusions in the report are substantially based, appeared in full in our issue of last week. Mr. HOLLAND'S observations on excessive cranial stress in the fœtus during labour are suggestive. The effects of stress on the shape of the head and on the septa of the dura mater and of certain cerebral blood-vessels are discussed in detail, and an original theory on cranial mechanics in the fœtus is evolved. Mr. HOLLAND believes that the septa of the dura mater act as stays or ligaments to the bones and exert a protective function during labour, helping to limit the alteration in shape or moulding of the head. Excessive moulding leads to tearing of the tentorium cerebelli and to overstretching and rupture of certain cerebral blood-vessels, the chief of which are the vein of Galen and its tributaries. He describes stress-bands in the septa, disposed on correct mechanical principles in the particular parts of the septa which are liable to be exposed to the greatest strain. Among the 167 fresh fœtuses the tentorium cerebelli was found torn in 81, associated with subdural cerebral hæmorrhage in all but 6; 46 of these fœtuses were delivered by the head and 35 by the breech, these breech deliveries representing 75 per cent. of the total number of breech deliveries examined. The frequency with which the tentorium is torn during a normal breech delivery has led Mr. HOLLAND to the opinion that the practice of hastening the delivery of the after-coming head is responsible for the death of many healthy fœtuses. Excessive cranial stress is set up by the forcible passage of the head through a valval orifice insufficiently dilated and prepared, and a revision of obstetrical teaching in this respect is urgently needed.

Summing up the causes of death in his sample, Mr. HOLLAND finds 51 per cent. due to complications of labour, 16 per cent. to syphilis, 10 per cent. to toxæmia of pregnancy, 2 per cent. to chronic renal and other maternal diseases, 6 per cent. to relative placental insufficiency, 5 per cent. to fœtal deformity, and lastly some 10 per cent. in which the cause of death was undetermined. A generalisation of some importanee is that more fœtuses were killed by the complications of labour than died during pregnancy from maternal or placental disease. He estimates that half of these children might have been saved, 20 per cent. by ante-natal care alone, 20 per cent. by improved technique in treating the complications of labour, and 12 per cent. by better attention at both periods. The two chief means of prevention of stillbirth suggested in this report are (1) better ante-natal care, and (2) an improved standard of midwifery practice, to be attained chiefly through the better education of the medical student. The report is extremely well produced, contains beautiful plates, and could with great advantage be read by everyone who attends women in childbirth.

Annotations.

"Ne quid nimis."

THE FREEZING AND THAWING OF FOOD.

A COMPREHENSIVE study by Dr. Walter Stiles, which has just appeared as a special report[1] to the Food Investigation Board, aims at indicating the scientific principles on which the preservation of food in the frozen condition is based. It also considers in some detail their application to the preservation of two particular articles of food—namely, fish and meat. The methods employed in freezing processes are chiefly of technical importance and from the public health standpoint the two chief items of interest are a consideration of the changes which take place during storage and any detrimental effects from thawing. It has to be remembered that the period of storage may be many months. The changes which may occur are evaporation of water, loss of aromatic substances diminishing commercial value, chemical changes due to autolysis, changes due to the presence of water and oxygen made evident by the development of rancidity, and changes due to the activities of bacteria and moulds. Evaporation of water depends on the temperature, the relative humidity of the surroundings, the movement of the air over the surface, and the area exposed. Dehydration is therefore reduced by close packing, preventing air movement, increasing relative humidity, lowering the temperature, and using some form of protective covering for the food. Similar methods diminish the loss of aromatic substances.

Autolytic changes are practically negligible during storage. Enzymes survive exposure to low temperatures, but are unable to act as catalysts until the temperature is raised to one suitable to their action. The prevention of rancidity is a matter of the reduction of relative humidity, lowering the temperature, and using protective wrappers to prevent contact with air. It will be observed that with the lean of meat the problem is to prevent the loss of water from the surface, but with the fat it is to prevent the condensation of moisture on the surface. The possibility of the development of moulds and bacteria in cold stored foods is of great importance; here the factors of temperature and moisture are chiefly operative. It is well known that most micro-organisms can readily withstand temperatures a long way below freezing-point. While the vitality of all is lowered at these low temperatures some of them can still grow, and the author refers to Brooks and Kidd's work on black spot due to a mould *cladosporium*, which will grow and produce spores at -5° C. Dr. Stiles points out that the bacteria in the intestinal wall of fish may fail to come into contact with the cold brine and he recommends the previous gutting of large fish. The disadvantages to this course he does not mention. Whether the vitamin content of food is affected by cold storage is still undetermined, but Dr. Stiles quotes Dr. Harden as finding that the accessory food factor in butter was not diminished by preservation in cold storage.

The influence on foodstuffs of thawing is not fully cleared up. Thawing being the reverse of freezing and therefore governed by the same physical laws, the method of freezing has a material influence upon the results of thawing. The more rapid the freezing the more likely are the particles of the substance in the solid condition to retain the spatial relationships they had in the previous sol or gel condition. In such cases thawing rapidly or slowly conducted is likely to result in re-formation of the original system. In slow freezing comparatively big crystals of ice are formed and thawing will then reveal a separation which may be permanent. Slow thawing will, however, even then give more time for a possible re-formation of the colloidal

[1] The Preservation of Food by Freezing with Special Reference to Fish and Meat: A Study in General Physiology. By Walter Stiles, M.A., Sc.D. Food Investigation Board Special Report No. 7. H.M. Stationery Office. 1922. Post free 10s. 3d.

system, and is to be recommended from this point of view. On the other hand, slow thawing possesses the objection that it gives time for micro-organisms to attack the surface layers of the meat and so reduce the interval during which the meat can be kept after the thawing is finished. This aspect of the matter was not, however, experimentally studied and probably a good deal of investigation is necessary before the best conditions for thawing are understood. As regards fish three methods are practised—i.e., thawing in crushed ice, thawing in water, thawing in warm air—the first and third being slow methods, the second a rapid method. Concerning the relative advantages of freezing and chilling as a means of preservation in cold storage, Dr. Stiles states that the advantage of the former is so great that it should be one of the objects of cold storage research to transfer as many foods as possible from the category of substances to which mere chilling can be applied to the category of foods which can be preserved in the solid frozen state.

The report is a valuable addition to scientific literature and both author and Food Investigation Board have put the community in their debt by preparing it.

SYPHILIS OF THE EPIDIDYMIS.

IN an interesting article in the *British Journal of Dermatology and Syphilis* for June, Dr. A. Reith Fraser summarises the recorded cases of syphilitic lesions of the epididymis. Of these, two main types are recognised, an acute interstitial and a chronic. The former is liable to be confused with a gonococcal epididymitis, a point of importance in differential diagnosis being that in syphilis the disease usually starts within the head of the epididymis, whereas in gonorrhœa the first portion attacked is the globus minor. The acute form is seen early in the course of the disease and gives rise to swelling, pain, and great tenderness. The chronic form is liable to be confused with chronic gonorrhœal epididymitis, tuberculous disease, or new growths. Examination of the prostatic fluid and the absence of other signs of gonorrhœa will help to exclude the former. Tuberculous disease and new growths usually implicate other uro-genital structures and are accompanied by tell-tale emaciation. The effect of anti-luetic treatment will usually clear up any doubt that remains. Dr. Fraser concludes by citing a case of bilateral syphilitic epididymitis in which the points of interest were the following: (1) The disease occurred 18 years after the initial infection; (2) the lesion on one side was acute and on the other chronic; (3) the prostate and seminal vesicles were not implicated; (4) both testes were normal. This case of syphilitic epididymitis, as usual, rapidly responded to treatment. The fact that the existence of syphilitic epididymitis is not widely recognised amongst clinicians lends interest to Dr. Fraser's description of the condition.

THE THIRD INTERNATIONAL CONGRESS OF THE HISTORY OF MEDICINE.

As we have already announced, this Congress will meet at the house of the Royal Society of Medicine, London, from July 17th to 22nd. It will be opened by Sir Alfred Mond, the Minister of Health, at 10.30 A.M. on the first day, when the delegates will be received and Dr. Charles Singer, the President, will give an address. Academic dress will on this occasion be optional. The sessions will take place morning and afternoon on each day. The subjects chosen for general discussion are: the History of Anatomy, Veterinary as well as Human, and the History of Epidemiology from the Fourteenth Century. There are also a large number of papers promised upon topics of historical interest. Sir Norman Moore will receive the members at the Royal College of Physicians on Monday afternoon; the Lord Mayor and Lady Mayoress at the Mansion House on Tuesday afternoon; Sir Anthony Bowlby at the Royal College of Surgeons on Wednesday afternoon. Visits will also be paid to the Barbers' Hall, to the Apothecaries' Hall, and to St. Bartholomew's Hospital. The Congress will conclude with a banquet at the Hotel Cecil on Friday evening. Saturday will be devoted to an excursion to Windsor, and from thence by boat to Cookham, in order that the foreign visitors may see something of the beauty of the Thames in summer. The Wellcome Historical Medical Museum will be open to members of the Congress throughout the week, and Mr. Henry S. Wellcome issues an invitation to the members to a conversazione on Wednesday evening. Those who desire to become members should communicate with the general secretary, Dr. J. D. Rolleston, 21, Alexandra Mansions, King's-road, Chelsea, London, S.W. 3. The subscription is £1 12*s*. for members of the medical, dental, and veterinary professions, and 8*s*. for their wives, daughters, and sons as associates. Fees should be sent to Mr. W. G. Spencer, 2, Portland-place, London, W. 1.

OPERATIONS UPON THE PYLORIC SPHINCTER.

WHETHER the wave of deep dissatisfaction with the results of gastro-jejunostomy as a curative measure, in certain cases of gastric ulcer is justified or not, the future will reveal. It must be admitted, when we reflect in how many thousands of patients the operation has been performed, that the number of real failures to the discredit of this physiologically very disturbing procedure, is surprisingly small. However this may be, the impression of failure has once more directed the efforts of investigators to the reconsideration of operations upon the pylorus as a substitute for gastro-jejunostomy. The difficulty of dealing with scarred, or actively ulcerating tissue in pyloric stenosis led most surgeons to give up the Heineke-Mickulicz method of pyloroplasty, and for this very reason and the added difficulty of mobilising the duodenum, especially in the presence of adhesions, Finney's operation has never become very popular. A method which restores the natural mechanics of gastric evacuation has many attractions, and is likely to be followed by satisfactory results as the after-histories of the 43 patients reported on by G. Grey Turner[1] show. J. S. Horseley,[2] who has modified the original Heineke-Mickulicz operation, and combined it with excision of the ulcer, has also obtained distinct encouragement for his procedure. The real stimulus to the revival of interest in pyloroplasty has been the exceedingly gratifying results which have been obtained in congenital hypertrophic stenosis of the pylorus by employing Rammstedt's method. The investigations of G. H. Miller, H. H. Bowing, and L. L. Stepp into the relative merits of certain operations upon the pyloric sphincter[3] are bound to influence the choice of such operations. Their experiments were performed upon normal dogs. They found that a typical Heineke-Mickulicz operation is followed only by a temporary increase in the size of the pyloric ring, and a similar ultimate reclosure ensued, when, by an ingenious technique, a portion of stomach wall was sutured between the ends of the divided sphincter. After Rammstedt's operation they were able to show that the arrival of a peristaltic wave at the pylorus tended rather to increase the size of the ring and the bulging of the mucous membrane. After death the cut edges of the muscular coats were still gaping widely. C. A. Pannett[4] showed in an experimental investigation that this result cannot always be depended upon. The incision may heal as a linear scar. W. A. Downes[5] has observed this to occur in children without evil effect, because, it has been suggested, the hypertrophied sphincter does not increase in size and strength at an equal rate with the rest of the stomach musculature, so that the disproportion between the relative strengths of the pyloric sphincter and the propulsive power of the stomach disappears with age.

[1] Surg., Gyn., and Obstet., 1912, xiv., 537.
[2] Journ. A.M.A., 1919, lxxiii., 575; Ann. Surg., 1921, lxxiii., 199; with W. T. Vaughan, Journ. A.M.A., 1922, lxxviii., 1371.
[3] Surg., Gyn., and Obstet., 1922, xxxiv., 763.
[4] Brit. Jour. Surg., 1921, viii., 31.
[5] Journ. A.M.A., 1920, lxxv., 228.

In order to obviate this unwelcome result, should the operation be performed in adults for other stomach conditions, Pannett suggests an oblique division of the sphincter or the interposition of a large pad of omentum between its severed ends. Miller, Bowing, and Stepp were able to show that there was no weakening of the wall of the pyloric canal at the site of the operation, when tested by hydraulic pressure. The strength of the wall of the alimentary canal depends apparently upon the fibrous submucous coat. Nevertheless it must be remembered that fibrous tissue subjected to continued tension without support from muscular tissue will always stretch and a diverticulum will be likely to form with the passage of time. Whether it will give rise to symptoms is extremely doubtful, and this consideration need not necessarily be a contra-indication to the performance of the operation. Finality has not yet been reached in the surgical treatment of gastric ulcer, but present measures on the whole give commendable results. Before we can consent to change them the new procedure must be proved to be more effective or more physiological, or to entail a smaller risk to the patient and less mutilation of the stomach.

REFORMS IN THE TREATMENT OF GALL-STONES.

IN a recent paper on the subject of gall-stones, Dr. Svend Hansen,[1] of Copenhagen, has published some statistics and comments thereon which are calculated to provoke a spirit of reform rather than of self-complacency. During a period of 21 months he has systematically examined the biliary system for gall-stones in every case coming to necropsy at his hospital. Among 1191 consecutive necropsies in persons over the age of 20 he found 293—i.e., 25 per cent. of the total—to harbour gall-stones. This was the case among 19 per cent. of the men and 31 per cent. of the women. This ratio of 2 to 3 differs considerably from the operation ratio, the proportion of men to women operated on for gall-stones being approximately 1 to 9. The divergence obviously depends on the fact that gall-stones cause inflammatory changes in their surroundings far more frequently in women than in men. Dr. Hansen found that when the biliary system was unaffected by the presence of gall-stones, there was no divergence in the sex incidence, but among the cases showing morbid changes as the result of gall-stones, the ratio of men to women was as 1 to 2. In as great a proportion as 23 per cent. of all the cases of gall-stones they were found in other parts of the biliary system than the gall-bladder, and Dr. Hansen emphasises this finding for the benefit of surgeons who are apt to neglect a thorough search of the whole biliary system for gall-stones. They are elusive things, and their presence is apt to be overlooked by the surgeon even when he probes and palpates most conscientiously; not infrequently gall-stones escape detection till every biliary passage is slit open by the pathologist. Even pathologists may err, and Dr. Hansen notes that the frequency with which gall-stones have been found post mortem has ranged from 1 to 18 per cent. These astonishing discrepancies do not, in his opinion, indicate differences in the actual incidence of gall-stones determined by racial, dietetic, and other factors, but they depend on the skill and diligence with which pathologists have sought gall-stones. In the period under review necropsies were made on 40 persons who had died of cholelithiasis and its sequels. Nine of these persons died in *medical* wards. In the same period necropsies were made on only 26 persons dying from appendicitis. These figures are in themselves illuminating. They are also deplorable, and Dr. Hansen, writing with the impartiality of the pathologist, suggests that the physician's attitude towards gall-stones at the present time is what it was a short time ago to appendicitis. Only when the great frequency of gall-stones becomes general knowledge, and the necessity for cases of this kind to be under the unhampered observation of the surgeon becomes recognised, will the treatment of gall-stones emerge from the most unsatisfactory position in which it stands to-day. To wait for biliary colic and jaundice before diagnosing gall-stones is often to wait until disaster has overtaken the patient. Test the urine for urobilin is Dr. Hansen's hint in this connexion.

[1] Ugeskrift for Læger, April 27th, 1922.

OCCUPATION CENTRES FOR MENTALLY DEFECTIVE CHILDREN.

OCCUPATION centres are, so far as this country is concerned, the most recent development in the training of defectives. The definitely educable type is already provided for in many areas by the special schools of local education authorities, and institutional treatment is now to some extent available for the "permanent care" cases, but both are far short of requirements, and in addition there are intermediate cases—chiefly low-grade feeble-minded and high-grade imbeciles—some of whom can, with a degree of security, be kept at home under supervision. Home training is in most cases hopelessly inadequate, and the children tend to become more and more a burden on account of their bad habits. It is for these especially that the occupation centre is designed, so as to provide "opportunities for learning muscular control, cleanliness, obedience, and simple manual work." The Central Association for Mental Welfare has just issued a pamphlet for the guidance of local voluntary associations in organising such centres. Useful advice is given in regard to staffing, work, and apparatus. The Association is prepared to assist practically with the initial steps and to provide training for teachers. A list is given of 16 centres already in existence, and the number is gradually increasing; in a few areas a further development is the formation of special classes for defectives over school age who are unemployed or unemployable. The Association is, we think, to be commended for its support of this new movement. It may appear to some a mistaken departure from the ideal of permanent institutional care which the Mental Deficiency Act embodied. But the Association is merely recognising an existing situation—insufficient provision of institutions through post-war economies—and providing a useful temporary stop-gap on the well-tried principle that half a loaf is better than no bread.

THE THERAPEUTIC ADMINISTRATION OF GASES.

THE description by Mr. Stanley Rowbotham on page 24 of a new and convenient form of apparatus for administering nitrous oxide and oxygen with or without admixture of ether vapour reminds us that, in order to obtain a fair test of any method of anæsthesia the materials must be easily available. This is a matter of much more difficulty in the case of gases than of liquids. It appears that, for some time past, cylinders of compressed oxygen are kept in stock at nursing homes and other places where operations are frequently carried out, but that hitherto the anæsthetist who wishes to administer nitrous oxide has often been in the position of having to bring his gas cylinders with him. This inconvenience can hardly result otherwise than in condemning the patient, should the supply of nitrous oxide fail, to the administration of some other more portable anæsthetic which had been considered less suitable for his individual needs. All those who had during the war practical experience of the use of nitrous oxide and oxygen as an anæsthetic in cases of injury associated with severe shock were confident that the extended use of these gases in cases of similar nature in civil practice would be a boon to the patient. The time seems to have come for nitrous oxide to be available in quantity at any place where emergency surgery is likely to be practised. With oxygen, on the other hand, the supply as a rule is there, or, if not

someone interested in limelight or oxy-acetylene welding is near by, but the methods of administration leaves much to be desired. With the increasing elaboration of surgical technique it is surprising that medical equipment has remained archaic. It is still quite familiar for the oxygen cylinder to have a tap which at first refuses to turn, and, when it does, promptly blows off the rubber connexion if it does not burst the tubing. The issuing gas is then administered cold through a funnel which the unwilling patient can readily dodge by moving his head from side to side. To administer oxygen like this is the same kind of extravagance as washing a motor car with petrol. Dr. John Ryle described in our correspondence columns last week a method whereby oxygen may be administered with economy and acceptably to the patient. The portable apparatus described in the current issue of THE LANCET by Dr. Geoffrey Bourne has been in use for some time in the wards of the medical unit at St. Bartholomew's Hospital, and has excited much interest there. It marks an advance in exact medication which might well be followed elsewhere.

RANVIER AND HIS WORK.

IT is the penalty of a long and peaceful old age that the achievement of a great man's activities may be forgotten. Louis-Antoine Ranvier was born at Lyons on Oct. 2nd, 1835, and died on March 22nd, 1922, at Thélys (Loire), where he retired many years ago after completing his life's work at the Collège de France. After completing in the year 1860 his medical education in Paris, he devoted his attention to pathological anatomy, and with his friend, Cornil, founded a private laboratory in the Rue Christine, a small street off the Boulevard St. Michel, whence was issued a text-book of pathological histology which became classical. Ranvier then turned his attention more and more to normal histology, and in 1867 became assistant to Claude Bernard, who secured for him the first appointment to the newly founded chair of general anatomy at the Collège de France. Until the time when he re-investigated the structure of medullated nerve fibres it was assumed that the medullary sheath, or white substance of Schwann, formed a continuous envelope or sheath round the axis cylinder. In 1871 Ranvier showed that the medullated sheath, or myelin, is entirely interrupted at regular intervals along the whole course of the peripheral nerve fibres, now universally known as Ranvier's nodes. It is, however, remarkable that Ranvier himself failed to notice the incisures in the medulla, which break it up into cylinder-cones, a discovery made later by Schmidt and Lautermann. Further studies in the connective tissue, blood-vessels, and lymphatics enabled Ranvier to complete our knowledge of peripheral nerve trunks. He also added to the sum of knowledge concerning non-medullated fibres, fully describing the lamellated character of the perineurium, which he called "the lamellar sheath," the number of lamellæ lined by endothelium being about 10–12. Turning his attention in 1872–73 to the degeneration of nerve fibres after sections, Ranvier described the histological changes included under the term "Wallerian degeneration." He was amongst the first to recognise that in the regeneration of nerve fibres growths of the axis cylinder are pushed out from the central segments. In 1875 came the demonstration that the medullated fibres of the central nervous system have no nodes and are not provided with the sheath of Schwann. The latter is usually continued beyond the last node of the fibres of the spinal roots and accompanies the nerve fibre until it pierces the pia mater and then disappears in the neuroglia surrounding the cord. No nucleus is present in the last inter-annular segment furnished with a sheath of Schwann. In 1885 Ranvier resolved the intimate structure of the neuroglia itself. In 1882 he solved the relation of the nerve fibres of spinal ganglia in mammals to the nerve cell. The emerging fibre divides at a node, sending a branch towards the centre and one towards the periphery. Following naturally on these studies came those on the terminations of nerve fibres in muscles, striped and smooth; in sensory surfaces, cornea, skin, and in electrical organs. In 1869, by the simple method of interstitial injection of a suitable fluid under the skin, he produced an artificial œdema, and in this way was able to unravel the relations of the connective tissue cells to the fibrous elements of the tissue and to disprove the views of Virchow on the connective tissue corpuscles. He contributed greatly to our knowledge of the structure of the vascular system—including the arrangement of smooth muscle in arterioles, the structure and morphological significance of the fibres of Purkinje, the valves of veins, and the formation and signification of the fibrin network. Perhaps the most compact piece of his work was an elegant contribution on lymph hearts. The development of blood-vessels and red blood were successfully studied in the "taches laiteuses," or milk-spots in the omentum of the young rabbit, and the knowledge thereby obtained and of the vaso-formative cells has become an integral part of histology. In his observations on the glandular system Ranvier corrected some results of Heidenhain. To him we owe the division of secretory glands into merocrine and holocrine glands. He studied the morphological changes in vivo under the microscope, and established fundamental views on the mechanism of secretion. With Cornil he was the first to show the glandular atrophy that follows ligature of the excretory duct in the submaxillary gland. After the manner of his master, Claude Bernard, Ranvier published his lectures for several successive years. These and many subsequent publications embodied much original work. He was a master of technique and the keynote of the whole was simplicity and accuracy in detail. He took the tissues and organs that lay ready to hand and studied them with a seeing eye and a penetrating brain. In his great work, "Traité technique d'histologie" (1875–82) lie enshrined his methods and his main results.

THE DECOMPOSITION OF HÆMOGLOBIN.

THE interesting lecture delivered last week by Prof. A. A. Hijmans van den Bergh, of Utrecht, under the scheme of London University for interchange of English and Dutch lecturers, of which we print an abstract on p. 34, deals with some aspects of the pathology of hæmoglobin which have not attracted as much attention as they deserve. The cases of curious cyanosis due to the conversion of a proportion of the circulating hæmoglobin into met- or sulphhæmoglobin are rare and in consequence the condition is difficult to investigate. But like other out-of-the-way diseases they are commoner in the experience of those who are on the look-out for them and Prof. van den Bergh and his colleagues have now had a considerable experience of them. Very interesting is his observation that pharmacopœial doses of sulphur, and even Apenta water, may produce a slight degree of sulphæmia. Sulphuretted hydrogen does not easily enter the circulating red corpuscles, but once the change is produced the new compound is stable and durable and hence the effect tends to be cumulative. A systematic search might well reveal more examples of these mild cases than are supposed to occur. The recognition of these "paræmias," as he calls them, was originally largely due to English workers, but even Prof. van den Bergh's generous appreciation of our contributions to the knowledge of hæmoglobin cannot pretend that the occurrence of hæmatin and bilirubin in the blood has hitherto excited much interest in this country. Both are found in, for instance, pernicious anæmia and large hæmorrhagic effusions, and he summarises the evidence which is now conclusive that bile pigments may be made in large quantities by tissues other than the liver. In his explanation of what is generally known as hæmolytic (that is, non-obstructive) jaundice he puts forward a

hypothesis which has been floating about in an ill-defined form for some time and which receives a timely formulation from him. He supposes that all the cells of the liver do not do the same thing and that while some make bile pigments and pass them into the blood it is the business of others to collect the pigment from the blood and pass it into the bile capillaries. It will be well that the facts should be re-examined from this point of view in which it is possible that the settlement of a long-standing difficulty will be found.

INTERNATIONAL UNION AGAINST TUBERCULOSIS.

WE announced last week the conference of the International Union against Tuberculosis, to be held at Brussels from July 11th to 13th, when three of the really important subjects in connexion with tuberculosis come up for discussion—namely, Tuberculosis in the Child, Prophylaxis in the Home by the Visiting Nurse, and Occupation During and After Cure. An important item will be a lecture by Prof. Calmette, dealing with the larger aspects of the problem of immunity in tuberculosis. An opportunity will be given to members of the union to see the practical efforts directed against tuberculosis in Belgium. The report has just appeared (Adlard and Son and West Newman, Ltd.), running to 260 pages, of the conference held in London last year, when discussion turned on the modes of diffusion of tuberculosis throughout the races of the world and the progress of the tuberculosis campaign in different countries. This volume will form a valuable book of reference for those attending the Brussels Conference and for all who are specially interested in tuberculosis from the public health side.

THE SALE OF TUBERCULOUS MILK.

AT a meeting of the Medical Committee of the House of Commons, specially summoned last week for the purpose, a resolution was unanimously carried stating that in the opinion of the medical representatives in Parliament the danger to the community, especially to children, from the consumption of tuberculous milk is so great that the selling of milk containing tubercle bacilli should be made a penal offence. The resolution is timely in view of the second reading in the House of Lords early this week of a Bill dealing with the supply of pure milk to the community. As regards infection with tubercle, the administrative difficulties are very clearly set out in Dr. W. J. Howarth's annual report for 1921 as medical officer of health for the City of London, which has just appeared. Three series of milk samples, totalling in all 78 items, were examined last year for tubercle bacilli, and nearly a quarter of these were found to contain them. Infected milk was despatched to London during the year 1921 from Sudbury, Lavenham, Chelmsford, Walton-on-Naze, Diss, Tivetshall, Spooner Row, Tolleshunt Darcy, Foulsham, Capel, Gunton, Thorpe-le-Soken, and Yarmouth. Dr. Howarth states that as a result of this bacteriological examination action has, of course, been taken at the farms at which the milk is produced, but he reiterates his conviction that little permanent improvement can be expected until the responsibility of ensuring that milk is free from tubercle is made the direct obligation of the farmer. At present it has to be proved that the farmer is aware that he sells or suffers to be sold or used for human consumption the milk of a cow which is suffering from tuberculosis of the udder. The difficulty of proving awareness is notorious, and Dr. Howarth contends with reason that it should not be necessary for any public body first to incur the expense of discovering that infected milk is being sold, and then to notify the farmer, in order that remedial measures may be adopted when the dangerous milk has already been consumed. The percentage of infected milk among the samples examined in London during the early part of last year was much higher than the average of the 18 years since continuous observations were begun in 1904, and the condition of London milk in this respect is disquieting.

IN DEFENCE OF MEDICAL RESEARCH.

IT is not easy to interest a mixed gathering consisting of research workers in different fields, practitioners, and lay sympathisers by a survey of medical research problems, for all speak different dialects. Sir Walter Fletcher, at the annual meeting of the Research Defence Society on June 27th, used words so simple that—to quote the chairman—even the most scientific could not fail to understand him. He paid a tribute to the work of the Society in helping to keep the path clear for research and acknowledged the right of its members to know what was being done. It was his privilege to keep in touch with research subsidised by the State throughout the country, and he selected at random one or two specific instances to show that the taxpayer's money was not being wasted. One of these was the recent discovery by Prof. Hopkins of the destructive effect of oxidisation on A-vitamin. Two sets of rats, on the same basal diet, were given a ration of the same quantity of a certain fat which had previously been subjected to heat. The sole difference in the rations was that air had been bubbled through the heated fat supplied to one batch, while that consumed by the controls was not so treated. The control rats throve, the others lost weight and health. The application of this simple experiment, for which live animals were essential, to human alimentation was likely to be far-reaching; for example, the lack of A-vitamin in lard, which had long puzzled biochemists, was probably attributable to the process of preparation, since in pouring the heated fat into the bladders in which lard was usually distributed to retailers there was ample opportunity for exposure of a large surface to air. Traders in Norway and Newfoundland were seeking advice from us as to the proper methods of producing cod-liver oil, and this new work would doubtless help them. Sir Walter Fletcher referred also to the results recently obtained by Miss Chick and her colleagues in Vienna, described on p. 7 of this issue of THE LANCET. The standardisation of biological drugs was, in his opinion, another urgent need which could only be met by animal experiment. The dangers attending the use of pituitary extract of undefined strength in labour have long been obvious to the practitioner; according to Sir Walter Fletcher, the much-needed Bill providing for the standardisation of the various extracts prepared by different manufacturing firms is to be introduced this session. Lord Knutsford, who presided, voiced the appreciation of the audience and drew attention to heart-muscle preparations shown by Dr. I. de B. Daly and Miss Bainbridge.

The excess of expenditure over income of the Defence Society (11, Chandos-street, W. 1) for 1921 was £104 and new members are greatly desired. For a subscription of only 10s. a year those interested in medical research can not only help in its advance, but are enabled actually to follow the progress made, since they are entitled to receive the bi-monthly journal [1] of the Society in which all important new work based on experiment receives early and adequate notice.

DEEP RADIOTHERAPY IN NEOPLASMS OF THE UTERUS.

A NEW paper on the application of the Erlangen method in the treatment of uterine neoplasms has lately been published by C. Chambacher and P. Descoust,[2] who have been working for more than a year with the powerful generating apparatus devised by Prof. Wintz (voltage 200,000, 16-in. spark-gap, and

[1] The Fight Against Disease. Macmillan.
[2] Presse Médicale, June 14th, 1922.

filtration of 0·5 mm. of zinc), by means of which a measured dose of very hard rays has been successfully administered to fibromyomata as well as to malignant new growths of the uterus. In the treatment of the former, where the tumours are small or where metrorrhagia is severe, the authors employ the massive lethal dose administered at a single sitting, as advocated by Seitz and Wintz. Even submucous fibromata, hitherto considered refractory to radiotherapy, were found to yield to an erythema dose, although for large fibromata Béclère's method of small repeated doses is considered preferable. As to malignant uterine growths, in three out of four cases of carcinoma of the cervix a single massive dose resulted in the complete disappearance of all the clinical symptoms, the fourth case requiring three such doses before a satisfactory result was attained. Radiosensitivity was found to vary in the different types of carcinoma, the fungating and nodular types appearing more sensitive than the ulcerative form, the stage of development of the neoplasm as well as its situation also having some bearing upon this point. While the authors do not altogether agree with Seitz and Wintz on the necessity for administering the complete lethal dose at one sitting, or that anything short of this is useless or even dangerous (owing to the smaller dose acting as a stimulant rather than as a destructive agent), they yet admit a definite relation between the effect of the total lethal dose and the time over which it is administered. The authors maintain that there is a tendency to exaggerate the importance of the drawbacks and dangers of radiotherapy of the uterus. Dermatitis does not occur unless the technique be faulty; hæmoclasic shock is temporary, the modifications of the cytological blood picture being completely readjusted in six to eight weeks, or even earlier; while the symptoms due to absorption of toxins liberated by the disintegration of the neoplasm —fever, weakness, anorexia, diarrhœa, and so on— are as a rule negligible in carcinoma of the cervix. There is, however, one specific danger in radiotherapy of the uterus, viz., a possible perforation of the rectum or of the bladder. If these organs are not yet invaded by the new growth, any such injury can only be due to some error in dosage or localisation, but even when they are partially involved perforation may be averted by extreme care. According to the French workers, the treatment is not contra-indicated even where the bladder or rectum is extensively involved and perforation would seem to be inevitable, provided there is some hope of completely destroying the malignant growth, after which repair of the injured organ can be effected by surgical means. A final note stresses the good results achieved by the combined action of X rays and of radium.

THE annual dinner of the Royal Society of Medicine will take place on Thursday next, July 6th, at the Hotel Victoria, Northumberland-avenue, London, W.C., at 7.30 for 8 P.M. Tickets at 12*s.* 6*d.* each, exclusive of wine for Fellows and their guests, should be obtained from the Secretary, 1, Wimpole-street, London, W. 1, as soon as possible. By special arrangement accommodation for changing clothes will be provided at the hotel without charge for those who intimate in advance their desire to avail themselves of it. The Minister of Health, Sir Alfred Mond, will be present.

THE election of Mr. H. J. Waring to fill the onerous appointment of Vice-Chancellor of the University of London, is announced in another column. To succeed such a zealous and loyal servant of the University as Sir Sydney Russell-Wells proved himself to be in his three strenuous years of office will be no easy task, but Mr. Waring's record of work as a senator, his well-known interest in University affairs, and his professional eminence give confidence that the interests of the University will be admirably served by him.

QUARANTINE IN THE NEAR EAST:

REPORT OF THE LEAGUE OF NATIONS HEALTH COMMISSION.

THE League of Nations has issued a Report (C. 342. M. 193. 1922. III.) made to its Health Organisation by a Commission which was sent to inquire into international arrangements regarding epidemic disease prevention in certain areas of the Near East (basin of the Eastern Mediterranean and Black Sea) and in connexion with the Mecca Pilgrimage. This inquiry was made in February and March of the present year, and the Report contains an annexe showing modifications proposed in Parts II. and III. of the International Sanitary Convention, 1912, as a result of this investigation. The Commission consisted of Dr. Th. Madsen (Denmark), Sir George Buchanan (Great Britain), Dr. Jitta (Holland), Dr. Jorge (Portugal), Dr. Violle (France), with Dr. Alexander Granville, President of the Sanitary Maritime and Quarantine Board of Egypt, as technical adviser.

The Report surveys the measures necessary to prevent the spread of formidable epidemic diseases (cholera, plague, small-pox, typhus, &c.) in and from the areas visited, from the point of view of international interests, and considers these measures separately in regard to: (1) The Suez Canal and ports whose sanitary service falls under the Sanitary Maritime and Quarantine Board of Egypt; (2) the Red Sea (the Mecca Pilgrimage and the Hedjaz Railway); (3) the Mediterranean littoral of Asia Minor; and (4) Constantinople and the Straits, and the Black Sea ports.

Suez Canal and Ports, the Sanitary Service of which is controlled by the Sanitary Maritime and Quarantine Board of Egypt.

The Commission points out that the Suez Canal, as the great highway of shipping between East and West, furnishes a channel by which diseases such as cholera and plague, which are epidemic or sporadic in India and other Eastern countries and are liable to be present in the Hedjaz, may be carried to countries elsewhere. The necessity of a sanitary barrier in these waters has always been recognised. At sanitary stations on the canal, administered by the Sanitary Maritime and Quarantine Board of Egypt, which has an international constitution, ships are medically visited and classified according to the information obtained and the health of the passengers and crew; sick persons are suitably dealt with and medically treated, and the measures of the Sanitary Convention are applied. These measures have a primary importance for the protection of European and other countries against the introduction of epidemic diseases, but they are equally important in the interests of passengers and crews.

The Commission considers that special sanitary measures remain necessary in the Suez Canal, and that these measures should be continued on the same broad principles which have been adopted in the 1912 and previous international conventions. For their execution the countries of the world would do well to continue to rely on administration by the Sanitary Maritime and Quarantine Board, particularly if the lines which will be followed in future are those recommended by the Office International d'Hygiène Publique in the proposed revision of the International Sanitary Convention, Part I., and if the special rules for these waters, which are contained in Parts II. and III. of the Convention, are maintained with certain modifications and simplifications which are suggested.

In regard to those functions of the Quarantine Board which relate especially to the protection of Egypt against the introduction of cholera or plague on any part of its frontier, the Commission points to the great alteration which has resulted from the opening of railway communications between Egypt and Palestine, Syria and Asia Minor, and recommends that local agreements should be made between the

administrations of those countries and Egypt to facilitate special measures against infectious diseases being imported by railway traffic, and to avoid inconvenience and expense due to needless duplication of medical work on frontiers.

Red Sea and the Mecca Pilgrimage.

The annual gathering of pilgrims to Mecca and Medina, the sacred cities of the Hedjaz, and their subsequent dispersal, has in the past on many occasions caused a widespread distribution of cholera and other epidemic diseases. The risk is specially great on account of the contact during the pilgrimage of races from tropical countries such as India, and the Dutch and British East Indies, with those who are returning to Central and Northern Asia, to Europe, and to North Africa. Successive inquiries and reports before the war have shown that it has hitherto been impossible to count on any effective sanitary measures being taken within the Hedjaz, and that the greatest possible difficulty would arise if non-Moslem countries were to attempt to intervene in these regions to secure that effective measures are taken by the authorities in control of the Hedjaz. It was consequently decided by international conventions that international action must be limited to: (*a*) Securing as far as possible that intending pilgrims are kept under observation at the ports of their departure and are healthy before they embark; (*b*) securing observation of pilgrims at a quarantine station en route to the Hedjaz, whenever they come from countries known to be infected or liable to be infected; (*c*) securing observation of returning pilgrims at a similar station, especially when returning to countries free from infection.

After reviewing the action taken before the war to give effect to these general principles of control, and to the various political and other changes which have taken place in consequence of or since the war, the Commission reports that it remains impracticable to rely on adequate preventive measures being taken in Arabia, and that the above system of protection should remain. In particular, it is necessary to continue (*b*), the key quarantine stations outside the Hedjaz kingdom, together with a new sanitary station on the Hedjaz railway at a point outside the Hedjaz kingdom but as near to it as possible. Inquiries are now being made in Transjordania for a site suitable for the purpose.

The protection of the pilgrimage by three main quarantine stations outside the Hedjaz kingdom, each controlled by a separate authority, would, however, obviously be incomplete without an effective means for the exchange of information between them and coördination of action as far as possible. It is, moreover, important that the many nations interested in the pilgrimage, the quarantine authorities in Egypt and Constantinople, as well as the international health councils at Geneva and Paris, should have the means of obtaining advice from, or making representations to, a technical body which represents the administrations of these stations. The supplementary measures required at places outside these stations can by this means be adjusted and determined by knowledge of the facts of the pilgrimage as a whole. Accordingly, the Commission propose that the technical heads of these stations should form a committee of coördination for the pilgrimage. This committee would be responsible to the League of Nations, in the sense that it should report to the Council of the League and deal with matters submitted to it for opinion or advice either by the Council or Health Committee of the League, or by individual countries.

The Mediterranean Littoral of Asia Minor.

The Commission gave close attention to the conditions in regard to epidemic diseases which at present exist in Syria and in Palestine, and studied the changes which have taken place in the public health organisations of each of these countries under the respective mandates of France and Great Britain. They obtained much evidence of the progress which has lately been made in the organisation of sanitary and epidemic services, in the notification and treatment of infectious diseases, vaccination, and like measures. This progress is striking and encouraging, especially when the previously backward and rudimentary character of preventive measures in these regions is considered.

At the Syrian and Palestine ports visited (Beyrout and Haifa) steps are being actively taken to improve the equipment of the port sanitary service, to provide better accommodation for observation of contacts and treatment of the sick, and efficient disinfection and disinfestation. "If the public health work which we saw at these ports is continued and remains efficient, the general provisions of the Convention (Part I.) should be well carried out, and important international interests sufficiently safeguarded. It remains important, however, to develop a system of exchange of information and mutual agreement on health matters between the expert public health staffs of these countries, and also between them and Egypt and other neighbouring areas. In this way unnecessary quarantine measures may be avoided and economy and efficiency increased."

The Report notes that a journey by ship from Beyrout to Constantinople, touching at a few ports in the mainland and one or two islands of the Ægean Sea, gave a practical illustration of the great importance of uniformity of practice and of mutual understandings between countries, in the interest of commerce. At each of the successive ports of call—Tripoli (French mandate), Mersina (Turkish), Larnaca and Limasol (Cyprus: British), Adalia (Turkish), Rhodes (Italian), Samos (Greek), Smyrna (Greek), and Chanak (Inter-Allied) the ship received a medical visit; nine visits in as many days. These inspections were made under different regulations, not necessarily governed by international convention and without reference, other than by examination of the bill of health, to the results of inquiries and examinations already made at previous ports. When the revision of the Convention has been completed there would be great advantage in a special conference with a view to local agreements between the sanitary authorities of the Eastern Mediterranean, in order to avoid unnecessary expenditure of time and money on what are collectively known as quarantine measures in this area. The fullest possible use should be made of those larger ports which are properly equipped and organised to deal with infectious diseases on ships, and the repetition of minor and incomplete measures at ports which are only indifferently equipped should be avoided.

Constantinople, the Straits, and Black Sea Ports.

Very great international importance attaches to the measures of protection against epidemic diseases which are taken in Constantinople and the Straits. The occurrence of a formidable epidemic in the town and port of Constantinople, or at ports in the Black Sea which have considerable commerce with the West, would at any time require special attention from the public health authorities of other countries within or even outside the Mediterranean basin. At the present moment these questions have exceptional importance in view of the condition of the Black Sea ports, the prevalence there of typhus, relapsing fever, small-pox, and cholera, and the absence of any sufficient sanitary control, and also on account of the continuing influx of refugees at Constantinople.

The Commission is of opinion that effective sanitary control on modern lines at the entrance of the Bosphorus is an essential measure of international hygiene, and that this control should be exercised there similar to that applied to vessels from infected ports when traversing the Suez Canal en route for the Mediterranean. They refer in this connexion to the present sanitary station at the northern entrance to the Bosphorus (Kavak) which is inadequate and dilapidated, and objectionable also on account of bad landing and the restricted area available for extension of the station. If any real attempt is to be made to control

the introduction of epidemic diseases from Black Sea ports, it is most important to provide in this neighbourhood a properly equipped sanitary station on modern lines, with hospital accommodation and provision for observation of contacts and satisfactory landing places.

In regard to administration, the Report pays a tribute to the excellent sanitary work accomplished during the Inter-Allied occupation by the Inter-Allied Medical Services, and their executive British officer in the town of Constantinople as well as in the port. Regarding this administration as necessarily temporary, the Commission advises the future establishment of a port sanitary authority with an efficient organisation and an international character for the sanitary control of the Straits. It is considered also that from the point of view of practical hygiene there will be very obvious advantages in the same body when established, exercising its functions over all the ports belonging to Turkey, including the Turkish ports in the Mediterranean and Black Sea.

The annexe to the Report consists of a series of articles numbering from 57 to 165, which are proposed by the Commission in substitution for the corresponding provisions in the International Sanitary Convention of 1912. These articles are based on the revision already proposed by the Office International d'Hygiène Publique of Articles 1–56, which lay down the general requirements for all signatory countries.

ADVANCED MEDICINE:

INTERNATIONAL COÖPERATION.

THE last of the present series of lectures in medicine arranged by the University of London in connexion with foreign universities was delivered last week by Prof. A. A. HIJMANS VAN DEN BERGH, of Utrecht, on the Pathology of Hæmoglobin, the chair being taken by Sir FREDERICK ANDREWES. An abstract of this lecture follows and we comment upon it editorially elsewhere.

THE PATHOLOGY OF HÆMOGLOBIN.

By PROF. A. A. HIJMANS VAN DEN BERGH.

The Paræmias.

Methæmoglobinæmia.—It is well known that a number of poisons and drugs can convert some of the normal hæmoglobin to methæmoglobin while it still circulates in the blood. Of more interest are the cases of cyanosis without pulmonary or cardiac lesions associated with pronounced enteritis and diarrhœa in which we have an autotoxic intraglobular methæmoglobinæmia. Profs. Stokvis and Talma showed that in these cases there is a methæmoglobin-producing substance in the intestines, and this has since been found to be a nitrite which has in some cases been found in the red corpuscles themselves.

Sulphæmoglobinæmia, or more conveniently sulphæmia, is liable to be confounded with methæmoglobin in cases of enterogenous cyanosis until the blood is examined. It will then be found that the abnormal pigment, unlike methæmoglobin, is not reconverted to hæmoglobin by reducing reagents, and that treatment with carbon monoxide shifts the characteristic absorption band in the red about five wave-lengths towards the violet end of the spectrum (Clarke and Wood). Most of the cases are associated with obstinate constipation, but this is not always present, and many examples of constipation show no sulphæmia. In one case of Hirschsprung's disease we have demonstrated the presence of traces of sulphuretted hydrogen in the serum on several occasions, and the addition of the boy's serum to normal blood resulted in the appearance of traces of sulphæmoglobin. The action of sulphuretted hydrogen on hæmoglobin in red corpuscles is quite slow, and any sulphuretted hydrogen in the blood is quickly destroyed by oxidation or eliminated through the lungs. Once formed, however, sulphæmoglobin is not easily destroyed or altered and persists for a long time; if it is injected into the blood of rabbits it may be found there for several days or even weeks. Hence very small amounts of sulphuretted hydrogen may in the end produce a considerable degree of sulphæmia. Some caution is needed in making such experiments, for we have found sulphæmoglobin in the blood of 10 out of 55 normal rabbits. Feeding rabbits with sulphur causes sulphæmoglobinæmia, and small amounts are found in the blood of patients taking medicinal doses of sulphur or even such a bland preparation as apenta water. The proportion of the hæmoglobin which is altered under these circumstances is small and difficult to estimate accurately, but it appears to be from 10 to 20 per cent.

Hæmatin.

The occurrence of hæmatin in blood serum was first studied by Schumm, of Hamburg, in a case of poisoning with chromic acid. He afterwards found it not very rarely in malaria, anaerobic sepsis, eclampsia, and pernicious anæmia. I have found it very often, though not constantly, in pernicious anæmia, never in secondary anæmias, however severe, and in about half the cases of ruptured ectopic pregnancy I have examined. In small amounts and in the presence of large quantities of hæmoglobin it is difficult to demonstrate with certainty.

Bilirubin.

Not so many years ago it was rather generally believed that bilirubin originates exclusively in the liver, and it was almost heresy to believe that jaundice could develop without liver disease. It is true that Virchow had many years ago shown that crystals occurred in old hæmorrhagic foci which looked like bilirubin and were called hæmatoidin, but it is only recently that we have realised that bilirubin may be made in large quantities in other tissues than the liver. This conversion is seen especially well in cases of hæmorrhagic pleural effusion where, some 24 hours after its development, we may find a concentration of bilirubin many times greater than that in the blood at the same time. It cannot be doubted that in these cases bilirubin is formed locally in the pleural cavity itself. In the pleural cavity itself we may find as much as 100 mg. of bilirubin, while the quantity in a well-filled gall-bladder will not exceed about 40 mg. The extra-hepatic origin of bile pigment is shown by its presence in distinctly larger quantities in the splenic vein than in the splenic artery. Ernst and Szappanyos, of Budapest, have also demonstrated its production by the spleen in perfusion experiments. These observations do not, however, prove that any bile pigment is *normally* made outside the liver, nor do we know from them whether jaundice can arise without the liver taking any part in the process. Jaundice which is not plainly obstructive in origin has been explained by an increased viscidity of the bile, by the liver cells excreting bile into the blood instead of the bile capillaries, and by Eppinger's microthrombi of bile. None of these views are quite satisfactory, and it seems to me necessary to assume that the secretion and excretion of bile are carried on by different elements. I suppose that the formation of bile pigment occurs in one cell, washed by the blood; that this cell discharges its product into the blood which brings it to the second cell which excretes it into the bile capillaries. The trace of bilirubin in the blood which may be called physiological arises in this way, and the amount will be increased if the balance of activity between the secretory and excretory cells is upset. Hence in many diseases characterised by increased blood destruction—hæmolytic anæmia, pernicious anæmia, hæmorrhagic effusions—there is an increase of bilirubin in the blood. There is often, also, too much hæmatin, but the relation between the two substances is at present obscure. From the observations of Dr. Engelkes on the specific oxygen capacity of hæmoglobin in pernicious anæmia it seems that part of the decomposition may begin while the red cells are still circulating in the blood.

THE PRISON SYSTEM AND ITS EFFECT ON PRISONERS.

IN view of the wide interest which attaches to the report of the Prison Enquiry Committee, edited by Stephen Hobhouse, M.A., and A. Fenner Brockway, and published on June 29th under the title "English Prisons To-day,"[1] we bring the following précis to the notice of our readers. Both "English Prisons To-day" and the companion volume "English Prisons under Local Government"[2] which preceded it, will shortly be made the subject of formal review in our columns.

The Prison System Enquiry Committee.

The committee was formed at the beginning of 1919 and has pursued its investigations for three years. Its chairman is Sir Sydney Olivier, and its members include the Earl of Sandwich, Lord Henry Bentinck, M.P., the Hon. George Peel, the Hon. Bertrand Russell, Mr. Laurence Housman, the Right Hon. J. R. Clynes, M.P., Mr. and Mrs. Sidney Webb, Miss Margery Fry, J.P., and Mr. Cecil Leeson (secretaries to the Howard League for Penal Reform), Dr. Ernest Jones, Rev. W. D. Morrison, LL.D., and Mr. Bernard Shaw. The report has been in large part written by the editors, both of whom served long terms of imprisonment during the war.

Nature of Evidence Obtained.

The chairman of the Enquiry Committee approached the Home Office in the early stages of the investigation and asked for official information, which was declined. Later the Home Office issued a letter to every prison, prohibiting the members of the staff from giving evidence. Before this letter was circulated, however, evidence had been obtained from 50 prison officials—Anglican chaplains, Roman Catholic priests, visiting ministers, medical officers, and warders of the different grades. Evidence was also received from 34 agents of discharged prisoners' aid societies and from 22 visiting magistrates. Two hundred and ninety ex-prisoners provided evidence. They included prisoners of varying types from local and convict prisons and the preventive detention prison, and two murderers who had served life sentences. Specimens of evidence from both prison officials and ex-prisoners, including a "lifer," are given in an appendix.

Cellular Confinement.

Part I. of the Report is devoted to a description of the prison system. The most extreme expression of the system of cellular confinement is found during the first month of the sentences of hard labour prisoners and the first three months of the sentences of habitual convicts. "The evidence regarding the bad effects of separate confinement is overwhelming," says the Report, and it proceeds to quote the opinion of a number of experienced witnesses. Even when, after the preliminary periods, the privilege of "working in association" has been gained, the regime of separate confinement is modified but little. "In both local and convict prisons the period of each working day spent by a prisoner locked up in his cell is 17½ hours out of the 24, whilst on Saturdays and Sundays he spends 19 to 20 hours in the same condition. There is, therefore, in reality a great deal of separate confinement even for those who are technically in association, and its bad effects remain throughout the term of imprisonment."

The Silence Rule.

The silence rule is described as the "most manifestly dehumanising" rule; its working is set out, and the Report states not only that few prisoners attempt to obey it but that those who do so invariably suffer grave mental consequences. "If it were possible to enforce this rule," says an ex-prisoner of long experience, "90 per cent. of the prisoners would lose their reason within a few months." Conversation occurs to some degree with the prison officials, and to a much greater degree it occurs surreptitiously with fellow prisoners. Even so, the strain of the silence so far as it is enforced is severe, and often the effects are serious. "I have little doubt," says an officer, "that this absurd and unnatural rule is responsible for many of the cases of mental deficiency which constitute a certain proportion of our prison population." By disobeying the silence rule prisoners can do something to retain their mental balance; but the cunning and hypocrisy which are necessary to evade discovery result in serious moral deterioration. "The silence rule," declares one ex-prisoner, "invites prisoners to practise deception so constantly that underhandedness and deceitfulness become their second nature."

A Summary of the Alleged Defects of the System.

"But the silence rule is only characteristic of the whole system. Self-respect is systematically destroyed and self-expression prevented in every phase of prison existence. The buildings in their ugliness and their monotony have a deadening and repressive effect. The labour is mostly mechanical and largely wasteful, and every indication of craftsmanship or creative ability is suppressed. The meals are distributed through momentarily opened doors as though the prisoners were caged animals. The sanitary arrangements are degrading and filthy, and the dress is hideous, slovenly, and humiliating. Education is limited to the most elementary standard and is denied to those above 25 years of age. To the vast majority of prisoners recreation is entirely unknown, and lectures and music are rarely available. A letter may not be written to (or received from) home until two months of the sentence have been served, and the conditions under which the visits take place are so humiliating that many prisoners prefer not to have them. The religious ministration is almost valueless because of the conditions under which it is offered, and the classification of prisoners is crude and ineffective. Punishments involving a starvation diet, solitary confinement, the postponement of letters and visits, and the loss of remission, are imposed for innocent and kindly speech or even for acts of unselfishness, and the health of prisoners is constantly neglected under the suspicion of malingering."

Psychological Effect of Imprisonment.

Part II. of the Report is devoted to a consideration of the mental and moral effects of imprisonment. The ratio of insanity in prisons is 86·6 per 10,000, ten times as great as that among the ordinary population. Even after deducting those cases where prisoners are regarded as mentally unsound on reception, the ratio is 41·3 per 10,000, nearly five times higher than outside prison. The insanity rate increases with the length of the sentences served. The proportion of prisoners certified insane after three and a half years of imprisonment is nearly three times as high as the proportion certified insane in the first month. Elaborate precautions are taken against suicide, but the suicide rate in prison is three times greater than outside. The proportion of persons between 20 and 25 who commit suicide in prison is nearly five times as great as outside prison, and suicides among prisoners under 20 years of age are at least 12 times as frequent as among youths of the same age outside. The number of "attempted" suicides is even more striking. During the years 1912–14 (the last for which returns are obtainable), the ratio per 10,000 was actually as high as 57·3. The medical officers describe many of these as "feigned," but the "attempts" admitted to be genuine reach 22·1 per 10,000. The cases of insanity and suicide are only extreme cases of a mental and moral deterioration from which the great majority of prisoners suffer.

"Even a few months of imprisonment appear to be sufficient in many, if not most, cases to produce an effect upon memory, concentration, and the power of will. In the case of the long sentence prisoner this process of deterioration may lead to premature senility, or a childish weakness of mind which renders him almost incapable of resuming normal life in any efficient capacity."

The Report endorses the conclusion reached by Dr. Charles Goring, after an examination of 3000 convicts, that there is no such thing as a criminal type

[1] London: Longmans, Green and Co. 25*s*.

[2] By Sidney and Beatrice Webb, with Preface by Bernard Shaw. London: Longmans, Green and Co. 15*s*.

in the sense of congenital differentiation from the law-abiding community, but takes the view that the process of imprisonment itself creates such a type.

"The criminal in the early stages of his career is not distinguishable in any striking or generic way from the law-abiding citizen, but in the course of time, and after several terms of imprisonment, he tends to conform to a type and to acquire the characteristic of the so-called criminal class."

And again:—

"The prison system, whilst it sometimes makes good prisoners, does almost nothing to make good citizens."

In connexion with the effect of the prison system as a deterrent or reforming influence figures are quoted from the latest returns showing that in 1920–21 no less than 54·4 per cent. of the male prisoners and 73·3 of the women prisoners had been previously sentenced at least 5 times, that 19·71 had been sentenced at least 6 times, that 12·73 had been sentenced at least 11 times, and that 2·61 had been sentenced at least 21 times.

Cost of the System.

The prison system (including Borstal institutions and the preventive detention prison) cost £1,337,359 in 1920–21—that is, an average of £121 7*s.* 10*d.* per inmate. The inmates of local prisons cost annually £110 8*s.* 5*d.* each, and convicts cost £166 4*s.* each.

"If this vast sum were doing something to lessen the volume of crime it would be worth while. If, however, as the facts indicate, imprisonment helps to make criminals, this expenditure is not only colossal waste, it is positively injurious to the community."

Suggested Direction of Reform.

The Report contains a series of extracts from a large number of convicts' letters, which the editors cite as being perhaps a severer indictment of the system than anything else in the volume.

In the concluding chapter it is urged that our penal theory must be revised. "Guilt, and the measure of it, is a question for a higher and a more competent judge than human beings are ever likely to provide." Deterrence, it is claimed, is not a reliable motive; not the least important cures for crime are the same as the remedies for poverty, for lack of proper education, and the like. These cures are, therefore, political rather than specifically criminological. Meanwhile, methods such as probation, which gives offenders opportunities to "make good" without withdrawal from ordinary life, should be greatly extended, particularly in the case of first offenders and young persons. For offenders clearly not amenable to such treatment a drastic inquiry should be made into the causes and antecedents of their offence, followed by a careful differentiation for purposes of re-education by various kinds of curative treatment for mind and body, and by a thorough, and probably arduous, training for ordinary life and resumed liberty. This treatment should be in the hands of trained men and women of proved aptitude and sympathy. The residuum of offenders who fail to respond to such treatment should be regarded as abnormal, and, if it be necessary to separate them, it should be done with a minimum of suffering.

Whilst the Report has been in the press, the Prison Commissioners have initiated a number of reforms; these, it is stated, have not affected the fundamental defects of the system. The editors consider, however, that anticipation of the Report has hastened their initiation.

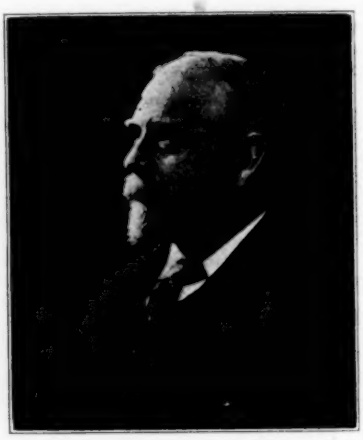
MEDICO-LEGAL SOCIETY.—The annual general meeting will be held at 11, Chandos-street, London, W. 1, on July 4th, at 8.30 P.M., instead of as previously announced. An ordinary meeting will be held at the conclusion of the annual general meeting, when Sir William Willcox will read a paper entitled "Acute Arsenical Poisoning."

JOURNAL OF SCIENTIFIC INSTRUMENTS.—We are asked by the Institute of Physics to emphasise that unless general support from scientific men and manufacturers is assured, the proposed *Journal of Scientific Instruments* cannot be issued. It is hoped that all who intend to subscribe will inform the Institute without delay, so that an estimate may be formed of the support which may be relied upon.

THE LATE SIR GERMAN SIMS WOODHEAD:

PROPOSED MEMORIAL.

AN appeal has been made to those who knew Sir German Sims Woodhead to aid in erecting a memorial to him in the Library of the Medical School at Cambridge, similar in design to those of his predecessors in the Chair of Pathology, the late Profs. Roy and Kanthack. The proposed memorial would consist of a slightly over life-sized portrait bust of bronze in low relief (the tablet 2 ft. 6 in. × 2 ft.) bearing the inscription "Sir German Sims Woodhead, K.B.E., M.D., Professor of Pathology, Cambridge, 1899–1921." It is suggested that, if sufficient funds are collected, a reduced copy of the memorial in bronze (measuring 9 in. × 7 in.) shall be presented to Lady Woodhead. It is proposed to put the execution of the memorial tablet into the hands of Mr. John Pinches, who will work mainly from a photograph (of which our illustration is a reproduction) selected as the most suitable for the



SIR GERMAN SIMS WOODHEAD, K.B.E., M.D., &c.,
LATE PROFESSOR OF PATHOLOGY IN THE UNIVERSITY OF CAMBRIDGE.

purpose, which represents Woodhead as his friends knew him at his best, and before the heavy work and responsibilities which the war threw upon him had undermined his constitution. The cost of the memorial, including its erection in the medical school, and that of the replica is estimated at £125, allowing for contingencies. If the subscriptions exceed the amount required, it is suggested that the surplus shall be applied to the purchase of books for the medical school library to which, during his life, Woodhead contributed so liberally.

It is thought probable that many persons would like to possess a reduced copy of the memorial plaque. If a sufficient number of persons intimate their wish to do so, reductions will be made in two sizes. The cost of these to subscribers would be: (1) Mechanical reduction, 9 in. × 7 in., bronze cast, £3 10*s.*: copper electrotype, £2 10*s.* (not including frames or mounts). (2) Small bronze plaques struck from a steel die, 2½ in. × 2 in., £1 10*s.*

A confident appeal is made to the many, whether colleagues, students, or laymen, whom Woodhead befriended and helped in his characteristic self-sacrificing manner, to aid in erecting this affectionate tribute to his memory. The appeal is signed by Sir T. Clifford Allbutt, Sir Humphry Rolleston, Sir Hugh K. Anderson, Dr. H. Bond, LL.D., Rev. W. B. Selbie, Dr. J. G. Adami, Dr. J. Lorrain Smith, Prof. J. Ritchie, Dr. Robert Muir, Rev. H. C. Carter, Prof. G. H. F. Nuttall, and Dr. L. Cobbett.

Subscriptions to the memorial tablet (not exceeding 1 guinea) may be sent to the hon. treasurer, Dr. L. Cobbett, Medical School, Downing-street, Cambridge. The names of the subscribers will be printed and circulated when the list is closed.

MEDICINE AND THE LAW.

The Trial of E. A. Walker.

Ernest Albert Walker, aged 17, a footman, was indicted for murder at the June session of the Central Criminal Court and found guilty of the act charged, but to have been insane at the time when he did it. This was the case, which attracted wide attention at the time, in which Walker, left alone in his employer's house in Lowndes-square, summoned a boy-messenger, killed him with an iron bar, fled the house, and gave himself up two hours later to the police. The evidence bearing on the condition of Walker's mind offered by the prosecution included a letter left behind by him for the butler, giving a callous account of the crime, and including the words, "I did not half give it to the d——d boy. I made him squeak," making reference also to the unwillingness of the prisoner to live since his mother's death. There was also a detailed programme, apparently compiled before the crime, beginning "Ring up Sloane-street—wait at front door," and providing not only for killing but for torture of the victim, which did not take place. The medical history of the prisoner's family supplied by the police included the record of four relatives, on both sides of the family, who had been confined in asylums. Walker's record at school was that of an absent- or vacant-minded boy averse from games. Called for the defence, Dr. E. D. Macnamara stated that he had come to the conclusion from the family history and the symptoms that the prisoner was an epileptic subject, and that when he killed the boy he was in a condition in which he would not realise what he was doing, and would be without any, or with only partial, recollection of his actions, which, at the time of doing them, he would not be able to control. The prisoner at the time of his trial he considered to be sane. A medical officer from Brixton prison, called for the prosecution, did not think that the prisoner would have had a continuous recollection if he had been in a state of epileptic automatism. He had, he said, no evidence that the prisoner at the time when the crime was committed was suffering from mental disease. Mr. Justice Roche, summing up, asked the jury to dismiss from their minds the recent discussion upon crimes of insanity; there had been much uninformed criticism of public officials and of public bodies, all of whom desired to do what was right. It would be highly undesirable for a jury to be influenced by such a discussion so as not to find a person insane who ought to be so found. The jury, after only five minutes' deliberation in private, found a verdict as stated above, and Walker was ordered to be detained during His Majesty's pleasure.

An Inquest with Negative Result.

At an inquest held at Bognor upon the body of a medical man a verdict was returned by the coroner of death from an overdose of poison. The medical man who had made a post-mortem examination could find nothing whatever to account for death, and the analyst's report on the contents of the stomach had disclosed nothing. Dr. S. A. Lane was of opinion that death was probably caused by poison, and he stated that he would be prepared to certify to that effect. The only evidence suggesting poison besides this was the presence of two bottles, one of which had been destroyed by the landlady of the lodging where the deceased had lived recently. The bottle destroyed had had no label, but it resembled the other, on which was part of a label showing that it had contained veronal. The bottles had been found on the top of the wardrobe in the deceased's bedroom, but there was nothing to prove that they were his, and that they had not been left there by lodgers who had preceded him. The widow refused to believe that the deceased took drugs, and there was no evidence that pointed to any intention to commit suicide. There was, however, evidence that he "took long sleeps," and that the widow had said that he should not be disturbed when doing so. The coroner in returning a formal verdict as above expressed the opinion that there had been an accidental overdose of poison; but the case appeared to have been one of mystery, the solution offered being only probable because no other explanation of the death was found.

NOTES FROM CHINA.

(FROM AN OCCASIONAL CORRESPONDENT.)

Moukden Medical College, Manchuria.

THIS College has held its third graduation ceremony and the event was notable as it marked the retirement of Dr. D. Christie, C.M.G., the veteran medical missionary and founder of the College, who, after 40 years of strenuous work in China, left for England in May. Opened in 1912, the handsome College buildings bear witness to a long-cherished plan now in process of realisation. Dr. Christie's aim was that it should become in time a truly Chinese institution, gradually and ultimately financed, staffed, and controlled by the Chinese themselves, with complete maintenance of its Christian and scientific character.

The College is well known in North China as one of the popular avenues into the medical profession. Its students are drawn from among the best in the Government middle schools, and their number is limited only by lack of accommodation. It has good equipment for class-work, and special facilities are provided by the Chinese authorities for dissections in the department of anatomy. The course lasts five years, and the standards are, as far as possible, those of British Universities. Since 1917, 74 graduates have passed out, most of whom are now satisfactorily holding responsible positions. In addition to the Chinese medical staff, some of whom have gone through post-graduate work in Edinburgh, there are ten European doctors, all British graduates. The hospital of 140 beds, attached to the College, gives ample facility for clinical work, and under English nursing superintendence, Chinese male nurses are put through a three years' course of training.

It might be added that the language employed as teaching medium is Chinese in accordance with the lexicon evolved by the committee on medical terminology which sat at Shanghai some years ago.

The National Medical Association of China.

This association has held its fourth Biennial Conference in Shanghai, and steady progress has been recorded towards the founding of a scientific medical profession in China. At the present time anyone can practise medicine in this country with or without the possession of a diploma, but the number of foreign-trained Chinese medical men is annually increasing, and efforts are being made to introduce some law and order in the ranks. It will, however, be long before any reduction can be made in the number of native doctors practising the old empiric methods handed down for the past 2000 years.

The following resolutions, passed at the general business meeting, are interesting as showing the aims and aspirations of the new race of Chinese medical men:—

1. *Resolved*, that the Ministry of the Interior (Home Office) be petitioned to recognise without delay the new nomenclature passed by the Terminology Committee. (There are now fixed medical terms in Chinese ideograms for 10,856 words.)
2. *Resolved*, that the association records its hearty endorsement of the proposal of missionary colleagues in establishing a strong Union Medical School in Shanghai.
3. *Resolved*, that the Nanyang Bros. be requested to send abroad at least three students every year, to study medicine.
4. *Resolved*, that this Conference expresses deep appreciation of the splendid work already accomplished by the Joint Council

of Public Health Education, and requests that such work be continued, as before, not restricting its sphere of activity to mission institutions alone.

5. *Resolved*, that the Ministry of the Interior be requested to write to the Customs Administration in order that the present unfair regulation against Chinese medical practitioners concerning the purchase and use of morphine, cocaine, and hypodermic syringes, be duly modified and placed upon an equitable basis.

6. *Resolved*, that the association request the Central Government to reconsider the petition submitted in the 1917 Conference in Canton, regarding registration of medical practitioners in China, so as to establish a legally qualified medical profession.

From these resolutions it will be noted that China has begun to wake up with regard to the claims of scientific medicine. Formerly the main influence was British: at the present moment America is undoubtedly leading, not only in the number of highly-trained medical educationists she sends over here, but in the facilities she offers for college tuition in the United States. There is here a friendly rivalry in which nothing but good feeling need be displayed. At the same time it behoves us not to let this great opportunity pass by unheeded of implanting our ideals and of taking our fair share in maintaining British methods among the rapidly growing number of young Chinese doctors who are becoming an increasingly important factor in the public life of China.

The Anatomical and Anthropological Association of China.

Dr. E. C. Faust, of Peking, speaking at a recent meeting of this association on his preliminary survey of the parasites of vertebrates of North China, stated that he had examined for parasites more than 2000 animals, mostly from the vicinity of Peking, and found the percentages of infection incidence among them to be as follows: Mammals, 60; birds, 33; reptiles, 22; amphibians, 55; fishes, 66; molluscs, 5. Most of these parasites have been found in the intestine of the host, although liver and lungs have relatively high infections. A direct correlation between the habits of the parasite and the dryness of the climate was found to obtain, since groups requiring no water-loving intermediate host showed high percentages, and those requiring no intermediate host always ranked high. While many of the parasites infecting men are likewise found in other vertebrates either as larval or definitive hosts, no correlation of types of parasites has been established.

The Lot of the Chinese Wounded Soldier.

The civil warfare which has been waged round Peking has emphasised the levity as regards many important details of organisation with which opposing Chinese generals pit their armies against each other. The right flank of the Manchurian troops was turned by the Chih-li army mainly because of lack of ammunition; the reverse spread all along the line and developed into a rout. There are no returns available as to the number of killed and wounded, but over 600 of the latter were literally "dumped" in Peking and became dependent on the philanthropy of foreign hospitals, as, owing to lack of funds, the big military hospital was closed some months ago. Beyond the application of first field dressings, there was little or no attempt at splinting of fractured limbs or other ambulance or casualty hospital treatment. Quite a large number of rifle bullets were extracted in the unexpanded state, and what at first sight looked like penetrating wounds of the chest were frequently found to be cases where the bullet had run round the chest wall. In many instances, as in the thigh, the bullet had been deflected by the bone without fracturing it. This was due to the age of the cartridges (much of the ammunition dating from 1905), and to the long range of fire by which a good number of casualties were the result of spent bullets. The Chinese soldier makes a stoical patient: he readily submits to operation, and being as a rule "as healthy as a horse" he has high recuperative powers. As a rule he is a vegetarian and a total abstainer; only exceptionally does one find a carious tooth in his otherwise perfect set of teeth, and the long hours of drill help to make him physically a healthy specimen of manhood with healing powers that are better than those of the average European soldier.

The want of medical arrangements has been fortunate for the troops, in that it brought many of them under the hands of British, American, and French medical men who have returned to China rich in military surgical experience gained during the war, and have freely given their services. On occasions such as this a striking comparative object-lesson can be gained of the splendid way in which our wounded were treated. Lack of compensation for wounds, lack of provision of artificial limbs or of convalescent treatment, or indeed of any solatium for the physical injuries received in doing his duty, make the lot of the Chinese soldier unenviable from the European point of view. Many Red Cross flags have been *en evidence*, but the amount of comforts supplied has been a negligible quantity.

NOTES FROM JAPAN.

(BY AN OCCASIONAL CORRESPONDENT.)

The Sixth National Medical Congress of Japan.

THIS Congress was held during April at Kyoto and was attended by over 3000 Japanese medical men. Delegates from China, headed by Surgeon-General S. H. Ch'iian, were the only foreign national representatives. This meeting is held every four years; in the intervening years regional conferences are held. Much work of a highly scientific nature was accomplished, for, as is well known, the Japanese medical profession is now able to compare favourably with that of America or any European country, and research is widely undertaken.

On the first day, Prof. Araki, Principal of Kyoto University and President of the Congress, delivered the opening address, giving a retrospect of the work done and progress made during the four years, and the various sections (16 in all) were then formed. At the general meeting, held on this day, two papers were read: (1) Metabolism of Egg Albumin introduced into the Body in any way except Orally, and (2) Methods of Advanced Study in Organic Chemistry. On the second day at the sectional meetings, among the more important papers were several dealing with *Schistosoma japonicum*, rat-bite fever, and artificially produced cancer. On the third day numerous papers were devoted to dysentery, the most important being the alteration in character of various strains of dysentery. A paper that attracted especial attention was one on a study of the functions of the thyroid gland. On the fourth day, the well-known Dr. Hata gave the results of his latest researches on the action of arsaminol and neo-arsaminol on diseases of the liver. The Surgical Section was well attended, special attention being given to abdominal surgery. On the fifth day a long paper was read on Trophic Disturbances in the Voluntary Muscles of the Body, in which the view was advanced that such changes may be brought about by artificial means. An exhaustive report was made on the uses and different qualities of Staining Reagents in the histological, pathological, and clinical practice of medicine.

Throughout the Congress the utmost hospitality was shown by the city of Kyoto to the members. The Imperial palace was, for the first time, thrown open for inspection. This is a rare privilege, and serves to show the high esteem in which the medical profession is now held in Japan. The Congress terminated by a banquet given by the city of Kyoto, at which the mayor presided and laid special emphasis on the debt owed by Japan to modern medicine in the greatly improved public health of the country in general, and in the marked decrease in mortality rates of the larger towns.

UNIVERSITY OF GLASGOW.—The degree of Doctor of Medicine (with high commendation) has been conferred on Dr. Cecilia Shiskin (in absentia).

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

Annual Report of the Ambulance Corps.

THE Vienna "Rettungs-gesellschaft," or first-aid ambulance corps, which is a private institution supported by voluntary contributions, was founded 40 years ago, after a theatre fire in which, owing to the lack of organised first aid, several hundred persons lost their lives in the burning building or died from their injuries. Since that day the "Rettungs-gesellschaft" has become a distinctive feature in the life of the city and has taken over all the duties performed in other cities by the hospital or police ambulances. In 1921 the corps was called upon in 15,018 cases of accidents and conveyed 10,635 cases to hospital; its members answered on an average more than 80 calls per day, of which about 42 per cent. were accidents occurring in the streets or in dwelling-houses. Over 20 per cent. were injuries sustained in workshops, in factories, and at public meetings; 30 per cent. were cases of attempted suicide. The corps deals only with living persons, not with the bodies of those found dead on the arrival of the motor ambulance car. Of late years a very complete outfit has been carried by the ambulances; it includes all antidotes against poisoning—which is a favourite means of suicide amongst females in Vienna—and a small but very efficacious apparatus for use against irrespirable gases. The corps is, however, financially handicapped at present; last year the expenditure on cars, fuel, lighting, salaries and wages amounted to more than 150 million kronen. Lectures and first-aid classes have been discontinued; the corps is negotiating with the Government and with the municipal authorities in order to obtain grants to carry on this notable feature of its propaganda work. It may be remarked that the organisation of this corps has served as a model for numerous other cities on the continent; in pre-war times it rendered assistance in great public disasters in Italy and Switzerland.

Present Situation of the General Practitioner in Austria.

The Austro-Hungarian Empire had more doctors than were strictly required in accordance with the standard of life of the population, but they had a large field for practice; a man knowing two or more of the national languages could settle and make a living practically anywhere. But in the Austrian Republic, specially in Vienna and the larger cities there is now a serious disproportion, particularly of older medical men, partly because the late army doctors are so inadequately pensioned that they are obliged to turn to private practice, and partly because a large number of doctors who practised in the health resorts and spas of the so-called Succession States have now been expelled from these places owing to their nationality. Younger practitioners, who can find no openings in Austria, are now turning their attention to emigration. A considerable number of doctors have accepted appointments in the Dutch colonies; the Dutch Government encourages such emigration, especially of well-trained specialists, and pathologists, surgeons, and oculists have been accepted right away from the hospitals. Russia, the Ukraine, and Albania also afford openings for the competent doctor; the Governments of the two last-named countries have advertised in the Austrian medical periodicals, offering young doctors excellent payment. Numerous medical men are prepared to go there in spite of the unsettled conditions of these countries. Those who remain in Austria have to face the difficulties arising out of the slow but steady disappearance of the private patient from their consulting rooms. He is replaced by the members of one of the numerous sick clubs, which are gradually extending their membership to the entire population of the country. With the inclusion of the municipal officials and their families in a sickness insurance scheme, another part of private practice disappears, and so the country is drifting into socialisation of the medical profession. With the exception of the rural population, there will soon be no more private patients. The conditions prevailing amongst the specialists are a little better; the latter can command larger fees, and they also have foreign patients, who make adequate payment for services rendered.

Examination of Blood in Surgical Cases.

At a recent meeting of the Vienna Medical Society, Dr. Stein reported on his systematic investigations conducted on 250 patients of the surgical clinic in the General Hospital within the last two years. He selected all cases where a prolonged stay could be expected, and made regular microscopic examinations of the blood before, during, and after operation, laying special stress on the total number of leucocytes and the relative numbers of the different kinds. The results obtained by this work can briefly be noted as follows: Cases of latent perforated ulcer, ruptured spleen, without manifest symptoms, and intra-peritoneal injuries almost always showed a high total leucocyte figure; typical operations followed by a normal uninterrupted recovery without complications showed a marked leucocytosis after operation, most marked after four to six hours, which in extreme cases reached 60,000 leucocytes, and gradually subsided. A corresponding fall in the neutrophile polynuclears was observed at that time. The eosinophiles disappeared from the blood soon after operation, but reappeared after two to three days. In cases of appendicitis, perforated ulcus ventriculi, or perforated gall-bladder, the marked leucocytosis existing mostly before operation went down rapidly, and the eosinophiles reappeared on the second or third day. If complications occur, however, this picture is altered, even before such complications are clinically manifest. If the number of leucocytes goes up after operation and the eosinophiles remain absent, a grave prognosis must be given. Retention of pus and abscess formation are also manifested by an early increase of leucocytes. Dr. Stein therefore emphasises the necessity of exact blood examination in all surgical cases, as results thereby obtained may have a great bearing on indication for or against operation, and may also enable an early search for complications otherwise remaining unnoticed until they have become dangerous. The blood picture is even better than the taking of the temperature as a means of early detection of danger.

June 15th.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Medical Organisation in Ireland.

THE movement for improved medical organisation in Ireland has been for some months at a standstill. This is, perhaps, just as well, for during the early months of this year discussion on the subject had taken a somewhat acrid turn, which was more likely to lead to disruption rather than unity. The fact is, that at the moment the minds of members of the profession are too much occupied with extra-medical affairs to be able to devote the requisite time and attention to medical organisation. For the past three years a scheme has been before the profession in Ireland for the formation of an Irish Medical Union, which would contain as a nucleus of membership the combined membership of the two existing associations, the Irish Medical Association and the British Medical Association. While this union should be autonomous in Ireland, it was intended that it should have an "external association" with the British Medical Association. Such association was, no doubt, necessary and advisable as long as the Government of Ireland was conducted from Westminster, but with the transfer of the seat of government to Dublin the

need becomes less obvious. The details of the proposed scheme were admirably set out in a paper by Mr. T. Hennessy, Irish Secretary of the British Medical Association, read before the Royal Academy of Medicine in Ireland last January (*Irish Journal of Medical Science*, March, 1922). The precise position of the scheme at present is not clear. The British Medical Association at its Representative Meeting last year had the subject under discussion, but it was complicated by a somewhat similar question as regards Australia, and the resolutions carried by the meeting were indeterminate. Until the British Medical Association gives assent to the proposals, it would seem to be premature to take further steps in Ireland. There is no use in hurrying discussion or action until matters are more settled, though it would be a great advantage to the medical profession of Ireland if it had an organisation ready to exert itself the moment settled government gets under weigh.

Medicine in the Irish Free State Parliament.

In the elections for the Provisional Parliament of the Irish Free State, which took place recently, some ten medical men have been successful. Two of the old medical Members, Dr. Ada English and Dr. J. Etchingham, have lost their seats. Of those who are now in Parliament, each party except Labour claims some. Messrs. Richard Hayes, McGinley, McCartan, White sit as members of the Treaty Party; Messrs. Crowley, Cusack, Ferran, MacCarvill as anti-Treaty; Mr. O. J. O'Byrne as a farmers' representative; Mr. M. Keogh as an Independent; and Sir James Craig as one of the representatives of Dublin University, who may be classed as Independent, and, like all the other independent members, in favour of the Treaty. The representatives of the medical profession in the Assembly may be regarded as fairly high. It is notable that comparatively few lawyers have been returned, so that the Irish Assembly will differ markedly as regards its professional members from most other popular assemblies. It is satisfactory to see so many medical men selected as public representatives, and should matters concerning health come before the Assembly, the medical members will occupy a position of much influence. It is more than doubtful, however, whether the present Parliament will have leisure or opportunity to attend to any social question, however pressing. Its whole time is likely to be occupied in dealing with the Constitution and in re-establishing order throughout the country. It is, on the whole, better that questions of medical reform should be postponed than that they should be dealt with hastily or impulsively.

Royal Medical Benevolent Fund of Ireland.

The annual general meeting of the Royal Medical Benevolent Fund was held last week, the President of the Royal College of Surgeons being in the chair. In its annual report the committee complains of the lack of support given to the Fund by the profession. It is pointed out that most of the donations and grants which are given from year to year are granted to the widows and orphans of men who have never given even one penny to the Fund. The number of applicants last year was 72, and the amount distributed was £1215 11*s.* The society's revenue for the year was £1999 15*s.* 5*d.*, compared with £1675 9*s.* 1*d.* in the previous year. The credit balance at the end of April was £1200 12*s.* 7*d.*

June 26th.

The Services.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. W. J. P. Adye-Curran retires on ret. pay.

The undermentioned relinquish their commns.: Temp. Maj. and Bt. Lt.-Col. G. P. Humphrey, and retains the Bt. rank of Lt.-Col.; Temp. Maj. T. Walcot, and retains the rank of Maj.; Temp. Capt. O. S. Maunsell, and retains the rank of Capt.; Temp. Capt. J. Graham, and is granted the rank of Maj.

MILITIA.

Capt. R. Cunningham relinquishes his commn., and retains the rank of Capt.

TERRITORIAL ARMY.

Col. A. B. Soltau to be Asst. Dir. of Med. Servs., 43rd (Wessex) Div., vice Col. R. Pickard, resigned.

Maj. J. H. Hunter to be Lt.-Col., and to command the 1st Scottish Casualty Clearing Station.

Capt. S. F. Linton to be Maj.

Capt. D. R. Jones (late R.A.M.C., S.R.) to be Capt.

Capt. A. W. A. Davies resigns his commn., and retains the rank of Capt.

Capts. D. D. Brown and H. W. Shadwell, having attained the age limit, are retired, and retain the rank of Capt.

Lt.-Cols. J. M. G. Bremner and J. F. MacIntosh resign their commns., and retain the rank of Lt.-Col., with permission to wear the prescribed uniform.

Lt.-Col. D. Rorie resigns his commn., and is granted the rank of Col., with permission to wear the prescribed uniform.

Maj. W. G. Paget resigns his commn., and retains the rank of Maj., with permission to wear the prescribed uniform.

Maj. A. H. Pinder resigns his commn., and retains the rank of Maj.

Maj. T. H. C. Derham relinquishes his commn., and retains the rank of Maj.

Capt. A. G. Buchanan relinquishes his commn., and retains the rank of Capt.

Capt. A. E. Ironside relinquishes his commn., and is granted the rank of Maj.

Supernumerary for Service with O.T.C.: Maj. H. B. Roderick resigns his commn., and is granted the rank of Lt.-Col.

General Hospitals: Capt. W. E. Alderson relinquishes his commn., and retains the rank of Capt.

TERRITORIAL ARMY RESERVE.

Lt.-Cols. M. A. Cooke, H. F. Everett, and H. G. G. Mackenzie, from General List, to be Lt.-Cols.

Majs. J. L. Menzies and J. H. Thompson, from General List, to be Majs.

Maj. J. H. H. Pirie relinquishes his commn., and retains the rank of Maj.

Capts. W. L. Cockeroft and C. S. Wink, from General List, to be Majs.

ROYAL AIR FORCE.

Medical Service.—The undermentioned are granted short service commissions in the ranks stated: A. J. Brown and P. T. Rutherford to be Flight Lieutenants; H. W. Street to be Flying Officer (Hon. Flight Lt.).

H. C. Perkins is granted a temporary commission as a Flight Lt.

INDIAN MEDICAL SERVICE.

The King has approved the retirement of Maj. H. B. Drake.

On the occasion of the visit of the Prince of Wales to India the King has appointed Lt.-Col. F. O'Kinealy, C.I.E., I.M.S., Chief Medical Officer during his Royal Highness's tour, to be a C.V.O., and Subadar Hira Singh, Rai Bahadur, Ind. Med. Dept., to be M.B.E.

DEATHS IN THE SERVICES.

Inspector-General Belgrave Ninnis, R.N., C.V.O., Knight of Justice of the Order of St. John of Jerusalem in England, who died on June 18th aged 84, was born at St. Austel, Cornwall, in 1837, and qualified for the medical profession in 1861, when he took the M.R.C.S. and L.M. Eng. and the M.D. St. Andrews and joined the Royal Navy. From 1864 to 1866 he was naturalist to the Northern Territory of South Australia Surveying Expedition, and in 1873 to 1876 served in the Arctic Expedition under Captain (Sir George) Nares, and was awarded the Arctic Medal. He was the author of Remarks on the Ethnology, Natural History, and Meteorology of the Northern Territory of South Australia and of a report on an Epidemic Among the Esquimaux Dogs in the Arctic Expedition of 1875–76. He was awarded the Gilbert Blane Gold Medal in 1881. A prominent Freemason, he was a vice-president of the Masonic Institution for Boys, vice-patron of the Masonic Institution for Girls and of the Mark Benevolent Fund, and life governor of the Royal Masonic Benevolent Institution. Inspector-General Ninnis retired in 1897 and was awarded the C.V.O. in 1912.

Public Health Services.

ABSENTEE INSURANCE PRACTICE.

THE custom of carrying on insurance practice in large and densely populated areas by means of a surgery which is only open during certain hours appears to be on the increase and has claimed attention in the House of Commons. So-called lock-up surgeries are much to be deprecated, for no practitioner can do his duty to his patients unless he is within call when any of those patients are taken suddenly ill. To conduct an out-patient surgery during certain hours and to leave the neighbourhood during the interval is to shirk responsibility, and such attendance is clearly not in compliance with the terms of the practitioner's agreement. The non-resident doctor leaves his duties for others to perform, and his conduct throws an additional burden on those of his colleagues who live in the neighbourhood. The regulation for emergency calls was designed to provide for urgent cases by allowing insured persons to send for the nearest doctor if their own panel doctor was not available. This they can do without additional expense, the cost being debited to the account of the practitioner on whose list the patient is. The regulation works fairly well for the patient, as it provides for his urgent need, but it has little deterrent effect on the non-resident practitioner who does not mind paying an additional fee occasionally if allowed to live away from his practice in more congenial surroundings. It must be admitted that there are areas in many of our large cities where it is difficult for professional men with families to live in comfort, while it is especially in these neighbourhoods that the work is heavy and highly skilled men are required. But a little organisation would meet all the difficulties. It should not be impossible to arrange a rota of practitioners to take night duty and be in constant attendance during fixed periods, the burden being shared by all the practitioners alike. Such schemes are in operation in certain districts. It is the absentee practitioner who disappears to his country residence after morning and evening surgery who creates the difficulty. A system might be arranged under which those who shirk their full responsibility would be paid on a lower scale of remuneration. We feel sure that panel committees generally would be prepared to assist the Ministry of Health in any measures they may devise to meet a real difficulty.

COMPLAINTS AGAINST INSURANCE PRACTITIONERS.

At the recent Whitsuntide conferences of approved societies certain complaints against insurance practitioners were formulated. The Grand Secretary of the Order of Druids is reported to have said:—

"They were out to prevent the doctors having large panels, and to ensure that every doctor going on the panel should give adequate service to all insured persons on his panel; that he should have adequate waiting-room accommodation at his surgery, and where he did not live at his surgery premises he should arrange for attendance upon his patients in case of emergency after surgery hours; further, that the distinction which had hitherto been shown as between private and panel patients should cease, and that there should no longer be separate entrances for private and panel patients."

At the conference of the Loyal Order of Ancient Shepherds, held in King's Lynn, the Chief Shepherd said:—

"We want the old-time liberty of calling in the doctor, a reduction in the interminable waiting at surgeries, and a removal of the present limitations in treatment."

To all these demands the medical profession as a whole will agree. It is equally in the interests of the doctors and the insured persons that these difficulties should be overcome. Much could be done to find remedies if there were complete coöperation between the societies and the doctors. Insurance committees are dealing with many of the difficulties and are being supported in their efforts by panel committees. The Chief Shepherd went on to demand that medical benefit should cover every form of sickness and incapacity and that a specialist should be available without involving any extra cost to the member. This is a really urgent need which should be pressed upon the Ministry of Health. Some day we may hope that in the interests of real economy the medical service will be completed and made to cover every medical and surgical need of the industrial population.

DRUG FINANCE.

In the sixth annual report of the South-Western Joint Pricing Committee statistics are given of the cost of drugs for the year 1921 based upon the figures of 15 committees. Over two million prescriptions were dealt with. The total amount of the chemists' accounts was £93,821, and of this amount £43,851 represents the cost of the drugs and £49,969 the dispensing fees. The total cost per prescription rose from 6·52 pence in 1917 to 10·1 pence in 1921, but still more interesting is the relation of the costs of drug to the dispensing fees. In 1917 the average cost of drugs in pence for each prescription was 3·64 and the dispensing fee 2·88; in 1921 the drugs cost 4·7 and the dispensing services 5·4. This is the first year in which the dispensing services have exceeded the cost of the ingredients. With the revision of the dispensing fees the former proportion of nearly half-and-half will probably be re-established. The average number of prescriptions per insured person given during the year was exactly 3. In the county areas the proportion was about 2½, but in nearly all the urban areas it was higher than 3. The cost of pricing the 2,000,000 prescriptions was £3642 10*s.* 4*d.*

REPORTS OF MEDICAL OFFICERS OF HEALTH.

Brighton.

In his annual report for 1921 Dr. D. Forbes, like other medical officers of health resorts, thinks that the Registrar-General has made too large an allowance for visitors in estimating the population of Brighton at 134,800 for the year 1921. His own estimate is 138,000. On the Registrar-General's estimate the birth-rate works out at 18·57, the death-rate at 12·57, and the tuberculosis rate at 1·28. The infant mortality rate was 79 per 1000 births. Dr. Forbes draws attention to the danger of delay in giving antitoxin for diphtheria, and states that it is exceptional for him to have to record so many diphtheria deaths where antitoxin was not administered on the day of calling in medical help. In 1910 disinfection of bedding after scarlet fever was discontinued with no apparent ill-effect, and since May 1st, 1921, the disinfection of rooms by spraying has been given up and a "spring-clean" by the householder substituted therefor. A small outbreak of scarlet fever in October was traced to an infected milk-supply. The well-known difficulty of finding work for patched-up consumptives is referred to. Dr. Forbes says, "There is much talk of after-care committees, but they are little good if they cannot provide suitable work, which need not be 'out of door' work. A hut at the Aquarium has been adapted as a club-room for male consumptives and proved a great boon, but the Ministry of Health allows no grant towards this expenditure. Minor ailments, such as tonsils, adenoids, eye, ear, and skin diseases, when it appears unlikely that the child will receive treatment otherwise, are referred from the infant welfare centre to the school clinic for treatment. At the V.D. clinic there is a great reduction in new female cases. During 1921 64 males and 49 females completed treatment for syphilis, while 51 males and 33 females ceased to attend before completion.

Dr. Forbes gives the results of an interesting study of infant mortality in 1901–12 compared with 1913–20 on various groups classified as (1) the poorest, (2) unskilled workers, (3) artisans, and (4) well-to-do. Comparing the two periods, in all groups there has been a great reduction in diarrhœal diseases; only in (1) has there been any appreciable fall in bronchitis and pneumonia deaths; only among (1) and (2) has there been a considerable improvement in the "prematurity atrophy" mortality, the differ-

ence between rich and poor as regards the last-named diseases being now inappreciable. Very great care is taken with regard to operations for adenoids and tonsils. During 1921, 362 school children underwent this operation through the agency of the school clinic, bringing the total up to 1911, without the occurrence of any fatality. The results of X ray treatment for ringworm have been very satisfactory. Children suffering from ringworm are allowed to attend school provided the affected area can be suitably covered by a cotton cap. Dr. Forbes attaches great importance to the search for cases among the contacts. During 1921, out of 256 contacts 60 were found to be suffering from ringworm of the scalp, and 17 of these infected contacts were below the school age and not in attendance at school. Ionisation treatment for discharging ears has been begun, and a fuller report on the results is promised for next year.

South Shields.

The Census was taken in South Shields at the beginning of "race week," and gave a population of 118,631 in the extended borough. In order to compensate for holiday movements the Registrar-General has allocated a population of 120,376. In his annual report for 1921 Dr. W. Campbell Lyons tells us that the birth-rate, which was 34·2 in 1920, has dropped to 29·6 in 1921, and that the death-rate, 15·2, and the infant mortality rate, 96, were the lowest ever recorded in South Shields. It is remarkable that the climatic conditions of 1921, combined with the privy system in vogue in South Shields, caused so little increase of the diarrhœa mortality under two years, which was slightly less than in London. Dr. Lyons, however, hopes "that the present insanitary system will not be allowed to continue longer than is absolutely necessary." Shortage of housing accommodation and consequent overcrowding is, Dr. Lyons tells us, one of the most pressing problems confronting the corporation. The death-rate from pulmonary tuberculosis was high, even if the 8 per cent. of these deaths occurring among Arab seamen is deducted, and the high rate is prevalent both among males and females. Dr. Lyons records with satisfaction that the notified cases of ophthalmia neonatorum fell from 50 in 1920 to 26 in 1921, and that all of the 26 cases made a complete recovery. The decrease in the infant mortality rate is all the more satisfactory in view of the widespread industrial depression and the closure of the coal mines in May, June, and July, and Dr. Lyons has no doubt that the supply of dried and fresh milk in large quantities greatly contributed to this decrease. The school medical work has increased markedly, and the accommodation at the clinic at many times was totally inadequate. The "cleanliness surveys" have resulted in a great improvement, and the appointment of an additional part-time dentist will ensure the necessary dental treatment to a larger number of children. The work of the municipal V.D. clinic goes on actively, but there is the usual complaint that patients cease attendance before completing a course of treatment. Dr. Lyons strongly advocates that compulsory attendance should be enforced by legislative measures.

Colchester.

Dr. W. F. Corfield records with satisfaction in his annual report for 1921 a death-rate of 10·6 (second only to 10·3 in 1920) in one of the hottest years within memory, and considers it "a striking testimonial to the general sanitary condition and cleanliness of the town and the purity of its water-supply." Outbreaks of diphtheria in two neighbouring districts made the isolation hospital particularly busy during the autumn and winter. Shortage of houses is still an urgent problem. Some 80 or more old houses are fit for nothing but demolition, but cannot be closed. Another evil result of the shortage is the high charge demanded and paid for lodgings. The Registrar-General's estimated population for 1921 was 43,377. The birth-rate was 20·7; the death-rate 10·6; the infant mortality rate 65·2; the death-rate from pulmonary tuberculosis 1·11, and from other tuberculous diseases 0·28. Dr. Corfield is satisfied that it was largely the work of the maternity and child welfare department and the health nurses that enabled Colchester to get through the hot, dry summer with so little diarrhœa.

SCHOOL MEDICAL SERVICE.

Blackburn.

THE total number of children medically inspected during 1921 was 7537; of this number 2102 were special cases. The report gives a list of seven clinics; out of 6316 children referred for treatment for various ailments 2364 obtained treatment under the local authorities scheme, 1282 obtained other treatment, and 2670 remained untreated. Berquand's methods have been used very successfully for "a class of terrible stammerers," two successive classes of 10 boys being completely cured, for a time at least. The headmistress of Regent-street special school for mentally defective children has followed up the careers of 143 children (99 boys and 44 girls) who have left special schools since 1910. Only 17 have not been traced; 10 are dead, 16 in institutions or under care, 100 are in occupations of which only 5 are recorded as precarious (79 being industrial or manual occupations) and 60 are earning over £1 a week. A comparison has been made of heights and weights of secondary school children with Dr. Arthur Greenwood's compiled heights and weights of elementary school children, and the inconsequent conclusion is drawn that Blackburn children are 1 or 2 per cent. above the average. The comparison should have been made with secondary scholars, of whom an extensive collection of heights and weights was made by Stephenson.[1] Compared with such an aggregate the Blackburn heights and weights fall about 5 per cent. below that of the average secondary school child. Blackburn has no weighing machines, and the Board of Education's attitude in refusing to sanction the proposed expenditure of £45 a year for six years on the purchase of these machines for the Blackburn schools is enlightening in view of their attitude on this subject 10 years ago. Much waste of official time and ratepayers' money is involved in the wholesale weighing and measuring of school children for statistical purposes. A weighing machine at the school clinic where children requiring it can be weighed accurately and periodically ought to suffice. Dr. W. Allen Daley's report shows evidence of much careful work and rigid economy in action.

Chelmsford.

The number of children examined at routine inspection was 1023. Dr. W. J. Cox in his report for 1921 states that there is a dental clinic and a school clinic for minor ailments. An oculist visits once a month, and an arrangement has been made with the Chelmsford Hospital for the removal of enlarged tonsils and adenoids. Treatment at the school clinic is confined chiefly to skin diseases and uncleanliness. This last, however, is not a serious problem in Chelmsford, but Dr. Cox's doctrine that "Neither the school nurse nor the teacher is responsible for the cleanliness of the child" is a doubtful one. Surely the chief purpose for which the teacher and the nurse exist is to educate the child. The fault of the present systems of dealing with uncleanliness is that these stereotype what was intended to be a mere preliminary demonstration, and by merely alleviating filthy conditions where they exist, fail to educate and prevent their occurrence. In Chelmsford one of our patchwork provisions is well illustrated. It is not a county borough, and the result is that the borough is responsible for dealing with educable feeble-minded of school age, while before and after school age or in cases which are non-educable the county is responsible. A nice problem might easily arise if the borough authorities consider a child non-educable and the county take the opposite view. The Board of Education and the Board of Control would presumably be called in to fight out the question.

[1] THE LANCET, 1888, ii., 560.

Correspondence.

"Audi alteram partem."

THE MEDICAL PROFESSION AND THE POLICE.

To the Editor of THE LANCET.

SIR,—I have lately ascertained that there is in this country an arrangement between the General Medical Council and the Home Office under which the "convictions of registered medical and dental practitioners are all reported to the Council and are duly recorded, including what may be regarded as trivial offences such as those under the Motor-car Acts, or those of which you speak" (a stray puppy). So that it is a fact that if during a doctor's round his chimney is fired and he is fined, he is reported to the Council and his offence is "duly recorded"! This is not embroidery of mine. My little girl's puppy dog infringed a county by-law. I was summoned. The superintendent told the magistrates' clerk that if I were fined, I must be reported to the Council. The clerk handed this information to the Bench, and they, in consequence, refused to convict and dismissed the case on payment of costs. (O! shade of W. S. Gilbert!)

I wish now to offer criticism, destructive and constructive, of this system—emphatically of the system, not of the Council itself. I speak as a practical magistrate of experience. I condemn absolutely the secrecy of this arrangement, savouring of the espionage of the dossier system. Medical men are entitled to know the rules of the game. No one to whom I have spoken is aware of this secret system. It should be made known to magistrates; their convictions are often modified by ulterior consequences—loss of pension or employment, or some professional indignity, as in my case quoted above.

Then I am not satisfied that trivial offences *are* under the jurisdiction of the G.M.C. Section 29, Medical Act, 1858, reads: "If any medical practitioner shall be convicted in England or Ireland of any felony or misdemeanour or in Scotland of any crime or offence, or shall, after due inquiry, be judged by the General Council to have been guilty of infamous conduct in any professional respect, the General Council, may, if they see fit, direct the Registrar to erase the name of such medical practitioner from the register." I submit that only actions which primâ facie might subject the offender to the penalty of being struck off the Register are here included. That this was the intention of the framers of the Act in 1858 is evidenced by the fact that for nearly 50 years after only felonies were reported. Then in 1906 all indictable offences (tried by jury) were reported and in 1912 all offences, however trifling. Is not this a good example of real bureaucratic government and departmental encroachment? I hold no brief for any black sheep in my profession and if it be established that the G.M.C. *has* jurisdiction over the whole flock from the blackest sheep to the lamb with a soupçon of grey in his fleece, then someone must diagnose the degree of blackness. I offer the following solution as one dealing adequately with real offenders, without subjecting anyone to indignity or injustice.

1. Convictions for indictable offences. These are provided for in the present system. They are reported by (*a*) prison governors, in cases of commitment to prison; (*b*) by Metropolitan police in London, where fine is imposed; (*c*) by chief constables in the country.

2. Convictions in courts of summary jurisdiction—before magistrates without jury. These cases are, at present, all reported to, and dealt with by, the Penal Cases Committee of the G.M.C. In all English tribunals the evidence on both sides is heard; all details which aggravate or extenuate are before the judges of the case. This would necessitate a member of the Penal Cases Committee sitting with the magistrates in every case in which a doctor was tried and retiring with them to consider the evidence. A conviction does not tell the whole tale; there are grades of guilt and grades of conviction. I assume that in the first instance, only the fact of the conviction is now reported by the police. Any subsequent or additional information is supplied by them. *This is wrong.* Their information is, at best, ex parte; they are in no sense a judicial body; they are often the prosecutors. The chief constable takes no notes of evidence given; he does not enter the magistrates' room where evidence is sifted. He can only furnish the fact of a previous conviction (if any); other details are a matter of his memory. I give two practical cases within my own knowledge: A medical man when drunk struck his wife—conviction for assault. Another medical man struck his wife who was drunk—conviction for assault. It would require a super Sherlock Holmes to spot which was the cad and which the martyr from simple police reports of these two cases. Even in "drunks" there are degrees of guilt. If my son (now first year) were just qualified and celebrated the occasion "too well" and were fined, I should like him reprimanded by a magistrate and not classed in the records of the G.M.C. with a man drunk when in professional attendance. The solution I advocate is practical—viz., coöperation between the Council and the magistrates. The men appointed by the Crown to administer justice on oath are the only ones qualified in their judicial capacity to assess for the Council the gravity of their convictions. They would spare the doctor who struck his wife under the great provocation for her drunken habits the extra penalty—rather cruel—of being reported to the Council. It is, to my mind, unthinkable that the Council should fear lest magistrates would shield real culprits. A word from the Home Office would secure that all serious medical offenders would be duly reported to the G.M.C. by the convicting Bench through their justices' clerk. This arrangement would scrap for ever the reporting and recording of trivial offences—a consummation devoutly to be wished in my opinion.

I trust that the Council will regard my criticism as written without malice in the best interests of my profession. I am, Sir, yours faithfully,

Stockport, June 26th, 1922. J. M. BRENNAN.

BACILLUS COLI INFECTION OF THE URINE.

To the Editor of THE LANCET.

SIR,—In his very interesting lecture on this subject in your last issue Sir William Hale-White calls attention to the difficulty of explaining the fact that this affection is far more frequent, at all ages, in females than in males, and involves the right ureter and kidney more often than the left. I venture to suggest that the correct explanation is to be found in the fact that obstruction to the passage of the urine down the ureters is more frequent in the female than in the male, and probably more frequent in the right ureter than in the left, and that the reason for this is an anatomical one.

In many women the ureters when traversing the base of the broad ligaments run in a species of fibrous canal, the ureteric canal, which in some cases is very well marked and can generally be recognised on one or both sides when performing the operation of total extended abdominal hysterectomy. In this canal the ureter may, when congested or hypertrophied as it is in pregnancy, be partially strangulated; this in its turn leads to some retention of the urine in the ureter and in the pelvis of the corresponding kidney, and such retention forms the first and most important ætiological factor in the infection from the bowel of the upper urinary tract by the *Bacillus coli*. The pregnant uterus at the fourth month, at the time when bacilluria most often begins in pregnant women, certainly cannot exert any pressure on the ureters,

and I know of no certain proof that the pregnant uterus even at full term ever does press on the ureters, to a sufficient degree to interfere materially with the flow of urine. This is one of those statements which is repeated by one writer after another, but which is probably incorrect and anatomically impossible. In most of the cases of dilated ureters complicating pregnancy which have been described the site of the dilatation was in reality below the level of the pelvic brim. The striking frequency of right-sided infections is possibly to be explained by the ureteric canal being rather better developed, as a general rule, on the right side than on the left, but the truth of this is for the anatomists to determine, and impressions gained from operation on patients with carcinoma of the cervix may well be misleading, but this is the impression I have formed when performing such operations entailing as they do the dissection and complete exposure of the lower ends of both ureters.

The presence of the ureteric canal is, I believe, then, the explanation of the greater frequency of *Bacillus coli* infection in the female as contrasted with the male, and is probably also the explanation of its greater frequency on the right side than on the left, and affords the only feasible explanation of the frequent occurrence of bacilluria in the early months of pregnancy at a time when any pressure on the ureters by the pregnant uterus is quite out of the question.

I am, Sir, yours faithfully,

Wimpole-street, W., June 26th, 1922. G. BLACKER.

THE CAUSATION OF "CASCADE STOMACH."

To the Editor of THE LANCET.

SIR,—It is a matter of considerable surprise to me to find that your reporter of the meetings of the recent Congress of Radiology and Physiotherapy in his note of my contribution there on "cascade stomach," instead of giving a synopsis of what I said (as he does in the case of all the other papers), comments adversely as follows:—

"Dr. J. H. D. Webster described the causation of cascade stomach; some of the examples given by him in support of his theory would hardly have been accepted by other workers as characteristic 'cup and spill' stomachs." THE LANCET, June 17th, p. 1210.

Comment of this nature would have been welcomed at the meeting, and have added to the interest of the discussion (which in so far as it referred to my paper was only favourable), but as many months may elapse before my paper can appear in the *Archives of Radiology*, or elsewhere, I should like to point out now that in my view this comment of your reporter contains errors in fact and in principle. Its errors in fact are, first, that I have not (and no one could have) *one* theory which could account satisfactorily for the great variety of cases included under the term "cascade stomach," and secondly, I gave only two examples of my own, one of which was typical, while the second corresponded to other already published examples. More seriously, its error in principle, in my view, is that what purports to be an unbiased record of proceedings is surely not the place for anonymous criticism. Am I not right, Sir, in saying that criticism in a report of this nature should only take the negative form of omission of matter which (in the reporter's view) is of slight moment and not worthy of record?

Criticism not made at the Congress itself would be more fair and suitable if deferred till my paper appears in print, when your readers will have the paper before them, or accessible, and can judge for themselves the facts and views to which your criticism refers. At present comment is almost like a review of an unpublished book. In general, criticism or approval of new, or obscure, or rapidly changing medical questions cannot be justly valued if the writer remains anonymous: but appearing in your journal it always carries weight. Hence this protest.

I am, Sir, yours faithfully.

J. H. DOUGLAS WEBSTER.

Chandos-street, Cavendish-square, W., June 17th, 1922.

THE INFLUENCE OF THE SUN'S RAYS ON THE SKIN.

To the Editor of THE LANCET.

SIR,—The leading article on this subject in your issue of June 24th is highly interesting, and will assist in a better appreciation of the action of the sun as a cause for disease. I am, however, at a loss to understand the implied pathology in normal persons. The commencement and the end of the article suggest a purely local action like that of a chemical irritant or destructant. Then in the second paragraph you refer to the direct action of the rays in normal people determining the localisation of certain eruptions of internal causation. Is it not possible that the actinic rays cause some nervous activity in the nature of a defence?—this defence being erythema in fair-skinned, and increased pigmentation in dark-skinned, persons. In both these instances the suggestion is defence, inasmuch as the actinic rays do not easily penetrate the blood or dark pigment. Where papules, vesicles, and bullæ form, they would seem to be analogous to the formation of a blister in scalding or burning, again defensive.

The first integumentary defence against excessive actinic energy is the sebaceous secretion, the second perspiration, the third the dermis. If these fail, erythema and pigmentation are called into play. If all these defensive conditions are insufficient the increased blood-supply will result in some hypertrophy which may be irregular or regular. An irregular hypertrophy is a skin disease. If the hypertrophy has a low resisting power it will form a suitable camping ground for bacteria. That actinic rays have a causal influence in some skin diseases is shown by the result of excluding them from the skin by means of an actinic ray-proof covering in the form of a greasy or metallic ointment or some other impervious material. The case of the lenticular eruption reported by Dr. Rasch is evidently rare. The most interesting part of the question is, What happens to a person whose defences are imperfect or, at the time of exposure, more or less inactive? Actinic rays are said to have an inhibitory and a destructive action upon the tubercle bacillus and the spirochæte of syphilis. In disease these are securely hidden away in places where the actinic rays cannot penetrate. When benefit accrues from exposure to those infected the benefit is probably due not to the direct action of the rays upon the germs, but rather to the training of the defences for the admission of the healthful amount of actinic rays to the body, and so an improvement of the internal defences, antibodies, and the like.

I am, Sir, yours faithfully,

R. CRAWSHAW HOLT, M.D. Durh., M.R.C.P. Lond.

Manchester, June 24th, 1922.

PROTEIN-BALANCE IN INFANT FEEDING.

To the Editor of THE LANCET.

SIR,—In his letter in your issue of June 17th on this subject Dr. Ronald Carter expresses the opinion that I do not sufficiently differentiate between the protein of human and cow's milk in the modification of cow's milk for the purposes of infant feeding, and in support of his criticism he quotes Dr. Emmet Holt as saying that "it has become increasingly clear that the majority of infants will not thrive normally on cow's milk unless they are given two or three times as much protein as is contained in woman's milk." I cannot say that this has been my experience, nay, rather with increasing experience I find that beyond a certain comparatively low percentage the larger the quantity of protein the worse the nutrition; the optimum amount is not a fixed quantity, it differs with the individual and it differs with the circumstances, but it never greatly exceeds the amount present in breast milk. This experience is supported on a priori grounds from a study of the known facts of the amino-acid make-up of the proteins of the two milks.

Karl Thomas, McCollum, Osborn, Mendel, and others who have studied the biological values of different kinds of proteins have indeed given us substantial grounds for believing that the vegetable proteins are, in this respect, greatly inferior to animal proteins. Thomas has arranged the following proteins in a descending scale of value, the protein of beef being 104, that of milk 100, that of rice 88, that of potato 79, that of pulses 59, that of wheat 39, and that of maize 29. If, therefore, vegetable proteins are substituted for animal or other proteins, they must be given in relatively greater amount if they are to be equally available for nutritious purposes; but no one, as far as I am aware, has ever suggested that the protein of breast milk has three times the biological value of cow's milk as a food for infants.

The great difference between the proteins of cow's milk and of human milk, apart from the relative proportions of caseinogen and whey proteins present in each, relates to the inferior digestibility of the former; but if an infant is incapable of digesting a small amount of the protein of cow's milk, it is hardly rational to expect that by increasing the amount the capacity to digest can be improved. The great disadvantage of cow's milk is that it is more refractory to digestion and consequently more liable to bacterial decomposition in the colon, the results of which are included in conditions of intestinal intoxication, quite apart from recognisable symptoms of indigestion. These are the really serious results of protein excess of which Dr. Carter confesses himself ignorant, but in addition to these there are all the later and deferred effects due to the strains of de-amination imposed on the liver by the excessive absorption of normally digested amino-acids, and on the renal function owing to the excessive elimination of the products of nitrogenous metabolism. Every physiologist knows that, apart from its uses for growth, repair, the elaboration of antibodies and the formation of secretions, nitrogenous food is, in a biological sense, a wasteful and expensive source of energy, and therefore should not be employed to replace the cheaper food elements—carbohydrates and fats. I claim that it is unsound to attempt to supply protein in much greater relative amount than it is supplied by nature in breast milk, that is to say, the ratio of protein to the combined carbohydrate and fat in an artificial food should not greatly exceed that of 1·5 to 10·5.

In my formula to which Dr. Carter takes exception I have made a correction for possible biological inferiority by giving 25 per cent. more protein than is actually present in breast milk, and, in spite of the admittedly important support he finds in Dr. Holt's published statements, I still adhere to my original view that "no matter how accurately a diet may comply with the caloric requirements, nevertheless, if the 'balance' or ratio between the three main constituents—i.e., the proteins, fats, and carbohydrates—is not reasonably correct, in the long run the infant's nutrition will be bad."

I am, Sir, yours faithfully,

Harley-street, W., June 24th. ERIC PRITCHARD.

PERNICIOUS ANÆMIA AND ACHLORHYDRIA.

To the Editor of THE LANCET.

SIR,—In your issue of June 17th Dr. A. F. Hurst reasserts the belief that the disease known as pernicious anæmia is the result of changes produced by the absorption of poisons from the alimentary canal due to a deficiency of the normal antiseptic action of the gastric juice. We do not feel that the existing evidence is sufficient for the acceptance of this view, and careful examination of Dr. Hurst's six paragraphs suffices to reveal the rather slender fabric with which the theory has been built.

1. We cannot agree with Dr. Hurst that "there is abundant evidence that the achlorhydria precedes the development of the anæmia." "A long history of digestive disturbances" is not sufficient ground on which to diagnose achlorhydria, and against the one case in which achlorhydria was known to have preceded the anæmia by three years must be set off such cases as that quoted by Sophie Hertzberg, in which there was a normal amount of HCl in the stomach.

2. In every large series of cases of pernicious anæmia who have been subjected to gastric analysis there are to be found a few who apparently did have HCl in the stomach contents. We have not encountered such a case, but all that we have examined have been rather advanced cases. We did not in our paper suggest that the achlorhydria was the result of a change in the percentage of hæmoglobin in the blood, but that it might be secondary to some blood change. It is probable that chemical changes occur in the blood in pernicious anæmia which have yet to be defined.

3. The persistence of achlorhydria during remissions is of little importance; few cases of pernicious anæmia give even the clinical appearance of complete restoration to health between attacks, and no one can dogmatically assert that any case has definitely returned to normal. Dr. Hurst's own figures show that in the cases he quotes the hæmoglobin percentage was not yet normal; it may be that other chemical factors remain more seriously affected.

4. There is certainly evidence of the occurrence of reduced gastric acidity after hæmorrhage. We gave a clear example in our communication, and we learn that Mr. James Sherren described the same thing as long ago as 1911. Our personal experience is that even with bleeding gastric or duodenal ulcers a high acidity *may* persist; we have not cared to perform gastric analysis soon after really severe hæmatemesis.

5. We tried in our paper to establish the protean nature of the secretory changes in cancer of the stomach; that true achlorhydria is rare in this condition—rarer, indeed, than Dr. Hurst suggests—has been our experience. When it does occur we find that it is usually in the cachectic type of patient. The original observation of Samuel Fenwick was that gastric atrophy occurred in association with advanced cancer of the breast and other remote organs.

6. Dr. R. D. Passey, in common with other observers, found oxyntic cells present in the mucosa he examined; this surely is more in favour of the achlorhydria being hæmatogenous in origin than of its being due to a gastric lesion.

In setting out these arguments against those of Dr. Hurst our chief desire is not to belittle the theory to which he adheres, but rather to demonstrate that the existing evidence does not justify the adoption of any dogmatic view. If it be true, as Dr. Hurst believes, that gastrectomy predisposes a patient towards pernicious anæmia, the fact is of tremendous import in view of the increasing frequency of this operation. Our chief wish in writing our communication was to direct attention to the evidence of pancreatic deficiency in pernicious anæmia, and this evidence remains unaffected by the present controversy.—We are, Sir, yours faithfully,

T. IZOD BENNETT.
E. C. DODDS.

Devonshire-place, W., June 19th.

PERNICIOUS ANÆMIA AND THE WIDAL TEST.

To the Editor of THE LANCET.

SIR,—The correspondence in THE LANCET concerning achlorhydria in pernicious anæmia leads me to draw attention to a case under my care in which there was ground for suspecting that a colon bacillus resembling Eberth's is the cause of some fatal anæmias.

A girl, aged 22, died in six weeks from what was clinically a rapidly progressive anæmia. The blood examination confirmed this, but it happened in the initial stages of the illness that the prostration and slight fever induced me to think that a rapid chlorosis plus the onset of an enteric fever was a possible explanation. Therefore I had a Widal test done, and it proved definitely positive. Without desiring to make too much of this, it would be interesting to know: (1) if the Widal test has been done in cases of pernicious anæmia; (2) if pernicious anæmia has occurred in those who were vaccinated during the war against the enteric group; (3) if it might not be worth while vaccinating with T.A.B., or similar vaccine, cases of pernicious anæmia who have been apparently cured with arsenic, but who will so certainly relapse.

I may add that severe internal hæmorrhage was carefully excluded and that the girl was a virgin.

I am, Sir, yours faithfully,

PERCY GULLY, M.R.C.S., L.R.C.P.

Hampstead, N.W., June 26th, 1922.

NEGLIGIBLE GLYCOSURIA.

To the Editor of THE LANCET.

SIR,—Long before Eberth's bacillus and the paratyphoid organisms were differentiated it was recognised that in some epidemics of "typhoid" the mortality was negligible and the course of the disease mild, whereas in others there were many deaths and the disease was of a severe type. It was not until bacteriological investigation provided the means for accurate diagnosis that it became possible to account for these differences and formulate a corresponding policy of treatment and prophylaxis. Dr. O. Leyton, whose letter under the above heading appeared in your issue of June 24th, I am afraid is in much the same position with regard to glycosuria as the older physicians were in regard to "typhoid," only the problem now is chemical and not bacteriological. I quite agree with him that there are certain cases of glycosuria which are not benefited by "fasting," and remain in a satisfactory state of health for many years in spite of the persistent presence of sugar in the urine, but I do not agree that these are all covered by his definition of "negligible glycosuria," or that all forms of glycoruria falling within his definition are negligible, nor can I agree that, judging from some of the cases he quotes, negligible glycosuria is synonymous with renal glycosuria, as understood at the present day.

A complete discussion of my reasons for these opinions would raise the whole question of the ætiology and diagnosis of glycosuria, and occupy much space, but I may point out a few of the difficulties and dangers of making a diagnosis of "negligible glycosuria" from the clinical symptoms and percentage of sugar in the blood alone. I have met with many cases of glycosuria where hourly examinations of the blood after an ordinary mixed meal have given figures well within the normal range, and it was not until we discovered that a short sharp rise to 0·20 per cent., or higher, followed by an almost equally rapid fall, may occur immediately after the meal that the cause of the glycosuria was revealed. If this particular high point is missed the condition might well be regarded as one of negligible glycosuria, for the usual symptoms of diabetes are absent, the glycosuria has generally been discovered accidentally, the history is often a long one, and diet has little influence upon the amount of sugar passed. In another type of case, also without clinical symptoms of diabetes, although the percentage of sugar in the blood never exceeds 0·16 per cent. to 0·18 per cent., even when it is estimated at short intervals, the actual increase in the sugar has been found to be much larger than these figures would indicate, so that there is a real but not an apparent hyperglycæmia. These cases might be regarded as examples of negligible glycosuria, too, but prolonged observation has shown that, if neglected, they steadily progress and eventually develop the complications of true diabetes. If "the essential character of negligible glycosuria is the very low renal threshold for dextrose" we do not thereby exclude true diabetes, for I have met with several cases where disease of the pancreas undoubtedly existed, but sugar was constantly excreted in the urine with a blood sugar ranging from 0·06 per cent. to 0·18 per cent., and it was only by careful dieting that the progress of the pancreatic condition could be controlled.

The experiments I have been conducting during the past few years, in conjunction with Mr. H. A. H. Howard and Mr. Cairns Forsyth, have shown that the concentration of inorganic salts in the plasma has an undoubted influence upon the permeability of the kidneys for dextrose, and that the most important element is calcium. In our experience a low percentage of calcium in the blood is always associated with hypoglycæmia and glycosuria. In some cases the subnormal sugar and low percentage of calcium are the only abnormalities, but in others a complete chemical analysis of the blood shows additional changes. The increased permeability of the kidneys in the one type is apparently due to an absolute diminution of the calcium in the plasma, while in the other it is the result of a relative fall; the former appears to be an innocuous condition, the latter is of more serious import, but more prolonged observation is necessary before we can be sure of the ultimate fate of individuals showing these peculiarities. Such observations serve to remind us how little we really know of the chemistry of the body and the changes it undergoes when metabolism runs along unusual lines.

Until we learn a great deal more than is at present taught regarding the metabolism of carbohydrates within the organisms and the alterations which take place in glycosuria and diabetes, so that a classification based upon scientific foundations can be arrived at, it is, in my opinion, only likely to make confusion worse confounded to introduce new terms which cannot be accurately defined and may be misleading.

I am, Sir, yours faithfully,

P. J. CAMMIDGE.

Nottingham-place, Marylebone, W., June 26th, 1922.

COMPLEMENT FIXATION IN GONORRHŒA.

To the Editor of THE LANCET.

SIR,—Having done several thousand gonococcus complement-fixation tests within the last five years I was interested in the work and conclusions of Dr. T. E. Osmond, reported in your issue of June 10th. I find my results at variance with his on two points. I am not convinced that positive tests can be obtained in very early cases, and where such results occur in cases having had a discharge only two days I am pretty confident that these are not new cases. Further, I do not think that positive reactions tend to persist for any length of time after complete cure. I agree with him that a positive reaction does not occur so early in women as in men, and I think this can be explained on anatomical lines.

I satisfied myself of the utility of the test in diagnosis by a long series of cases in the army, where solely by means of this test cases of active gonorrhœa were frequently discovered among men admitted for syphilis and where gonorrhœa was not suspected. Since then I have had an opportunity of doing 1500 tests on women attending a civil clinic. The results have not been published for various reasons, one being that the clinician and I worked too far apart to be able to meet for the adequate discussion of the many problems arising from repeated tests on the same cases.

In this series, covering 507 cases, I did not get so low a percentage of false positives as Dr. Osmond. 119 cases gave a positive first test, and of these six do not appear to have had any gonococcal infection at the time. Three of these, it is true, were only tested once, and so far as I know only examined once clinically; and I decline to condemn the tests on the clinical evidence of one examination, knowing how frequently the test has given correct positive results before clinical or bacteriological evidence. Still, I must allow the possibility of 5 per cent. false positives among these cases. The cause of this I cannot determine. It does not appear to have been due to faulty technique, since other tests on the same days were completely negative, as well as the negative control; nor to contaminated serum, since the serum controls were perfect. A similar result occurred among the cases giving a negative first test. Here, of 75 cases considered to be non-gonorrhœal and giving a negative reaction on the first occasion, eight gave a doubtful or positive second test. Three of these might be regarded as suspicious, but in the other five gonorrhœa could be reasonably excluded, yet one of these five gave a positive second test. Later on, perhaps, Dr. Osmond will be able to give us subsequent results in his three non-gonorrhœal cases giving positive tests and the nine possibles giving a similar result.

From the prognostic point of view the test is of very limited use, particularly in female cases. Regarding increased positivity in the test as a sign of an increased attempt at immunisation, and, therefore, as tending towards cure, I was at first hopeful that by means of a series of tests at suitable intervals it would be possible to prognose cure, or at least to determine whether a patient was making progress or otherwise. But I soon found that series of repeat tests on the same individuals showed remarkable fluctuations from positive to negative, and vice versa, without any apparent agreement with the clinical condition at the same periods. This fluctuation is, in my experience, much more marked among women than men. And it makes it practically impossible to publish the results without quoting every case in extenso. I spent many weary hours wrestling with this problem, and as the result I venture to suggest an explanation which I readily admit may not be completely satisfactory and may not account for all similar cases. I put it forward for what it is worth in the hope of eliciting the views of others who have done many repeat tests on the same cases. Several of my cases were tested seven, eight, and even nine times.

The fact that struck me was that many cases of some duration gave a negative, or at most a doubtful, reaction when both clinically and bacteriologically they showed active infection. Such a result as this frequently occurred: "Pus from cervix and urethra; films from both positive; test − − −" Now this was too frequent to be explained by technical error. Moreover, it happened in cases which had previously given a positive reaction. It must, therefore, be due to absence of stimulation to antibody formation. Antibody formation takes place at some distance from the local site of infection, probably largely in the bone marrow. Whatever the antigen stimulating it, this must be carried by the blood to the antibody forming tissues. Some absorption from the local site must thus take place. In an open situation, such as the female urethra and the patulous cervix of gonorrhœa, there is little opportunity for absorption. Phagocytosis is here the normal method of resistance to the infecting organism. The pus formed has a free vent and is carried away.

This led me to examine more carefully the clinical records of those cases showing a positive reaction sandwiched between negatives or doubtfuls, and I found a considerable number of these showed closed-in foci, abscesses in Bartholin's glands being fairly common. Such a case as the following will explain what I mean:—

413. An old case.
June 24th: + + −. Urethra positive; cervix signs of old gleet.
August 20th: No test. Bartholin abscess, gonococci found in pus. Bartholin glands dissected out on Sept 8th.
Oct. 12th: − − −.
Oct. 30th: No test. Bartholins full of pus again (no note as to gonococci being found this time).
Nov. 27th: ± − −. Bartholins healed. Clinically negative.
Dec. 30th: + + +. Looks quite negative clinically.
Feb. 1st: − − −. Clinically negative.
March 8th: ± − −. (Regarded as a negative test.) Clinically negative. Discharged.

I suggest, as the explanation of this series, that there was originally a dammed-up focus in the Bartholin's glands from which antigenic absorption was taking place. The operation in September broke down the dam temporarily; a free outlet was allowed to the disintegrated products and antibody production ceased. The operation being incomplete, the dam was rebuilt (as shown by the note of Oct. 30th), and fresh absorption occurred, resulting in a rising reaction, culminating in December, and falling later as the condition proceeded to cure. I admit that few of the cases I tested are as apparently easy to interpret as this, and there are a number giving strong positives where no mention is made of any obvious focus. None the less, there are a considerable number of cases of a similar character to the foregoing in which there are notes of "Bartholins enlarged," "Bartholin abscess," "Skene's abscess," "Tubes," and the like; and I think it is probable that if this view had been in the clinician's mind he would have found similar indications in other cases. This would also, I think, explain the more frequent occurrence of strong positive reactions in men than in women. Anatomically, men have more opportunity of hiding away the gonococcus than women.

But if this view be correct certain consequences follow. First, that a positive reaction is, from the prognostic point of view, far less evidence of an attempt at cure than evidence of an active, it may be hidden, shut off focus. I think it is very doubtful if antibody, in the sense of complement-fixing body, plays any considerable part in the cure of gonorrhœa. Secondly, that antibody formation—so far as our present tests can detect—soon ceases after a free outlet for the gonococcus and its products is established; that, in fact, antibody formation is proportionate to the amount of stimulus reaching the antibody forming tissues, or in other words, to the absorption by the blood of autolytic products. If this be the case, then no number of negative tests will ever serve as a test of cure. A strong positive reaction is of immense value as indicating a focus, perhaps not clinically obvious; but it would seem that the pronouncement of cure must remain in the clinician's observations.—I am, Sir, yours faithfully,

A. H. PRIESTLEY,
Assistant Bacteriologist.
Public Health Department, University of Birmingham, June 14th, 1922.

DIATHERMY IN SURGICAL PRACTICE.

To the Editor of THE LANCET.

SIR,—I am afraid I must disclaim responsibility for the remarks attributed to me in the discussion on Diathermy in Surgical Practice which was reported in your issue of June 17th. I was an interested listener to the opening speeches at the meeting, but I was obliged to leave early, and so had no opportunity for speaking myself. Perhaps I may be allowed to put down here what I would have said if I had been able to stay long enough.

In the first place, I wish to endorse what was said by Mr. Douglas Harmer in connexion with carcinoma of the tongue and mouth. I believe diathermy to be far the most hopeful treatment in all cases of carcinoma in the mouth, whether they be amenable to complete excision or not; and I have used this method entirely for the last 18 months with much better results than I ever obtained with the knife alone. I have not yet had any case of secondary hæmorrhage, but at the same time I think it is advisable to tie the lingual artery in cases of carcinoma of the tongue, because I believe that starvation of the growth by curtailing its blood-supply is a very helpful factor in preventing recurrence. I have several times removed enlarged glands from the neck at the same time as I have used the cautery with no harmful result, and I can see no reason for deferring the operation on the glands to a later date. For rodent ulcers and epitheliomata of the skin, again, I consider that diathermy gives much better results than simple excision, and I now only excise very small early rodent ulcers which are situated on loose skin and can easily be removed without the risk of an inconvenient or unsightly scar. Where the base of the growth is bound down to deep structures the scar left by diathermy is frequently hardly noticeable, and, moreover, the healing in these cases is remarkably quick. My experience of diathermy for lupus is limited to four or five cases, but the results with these have been so good that I shall use the method much more in future. The only disadvantage, in the case of lupus involving wide areas of skin, is the length of time that must elapse before a sufficient bed of healthy granulations is formed for the planting of skin-grafts, but considering the uncertainty of the results of simple excision and X ray treatment I do not think this disadvantage is a very serious one.

I was disappointed that no mention was made during the discussion of the treatment of sarcomata. In February of last year I removed a large sarcoma from the temporal fossa of a man. At its base the tumour had eaten deeply into the bones forming the floor of the fossa, and after scraping away the growth I exposed the whole area of attachment to the action of diathermy. There was no recurrence until about two months ago, when a rapidly-growing tumour appeared in the parotid region, and a fortnight ago I cut down on this, and, finding it entirely confined within the sheath of the masseter muscle, I scraped it out and again diathermised the cavity in which it lay. This case is encouraging because the original site of the sarcoma has remained quite free from growth for nearly a year and a half; and I think that, in view of it, one is justified in giving diathermy a wider trial in the treatment of sarcomata of bone.

There are doubtless many other conditions for which diathermy has been and will be used, and one occurs to me as I write—namely, oriental sore. I have seen it stated that intravenous injections of antimony tartrate act as a specific in this disease. This was not at all my experience when I used the method during the war in Mesopotamia, and I gave it a very wide trial. One sees little of oriental sore in this country, but I shall certainly try the effects of diathermy on it if I have an opportunity.

I am, Sir, yours faithfully,

R. DAVIES-COLLEY.

Devonshire-place, W., June 22nd, 1922.

*** The remarks attributed to Mr. Davies-Colley were made by Mr. Philip Turner, to both of whom we express regret for the reporter's slip.—ED. L.

THE NORMAL STOMACH.

To the Editor of THE LANCET.

SIR,—In the leading article entitled Applied Physics in Medicine in your issue of June 17th is a reference to my contribution to the proceedings at the Congress of Radiology and Physiotherapy. You apparently give me credit for the dissection of the muscle fibres of the stomach which were shown by Mr. G. Jefferson, and which are, of course, his own original work.—I am, Sir, yours faithfully,

Manchester, June 19th, 1922. A. E. BARCLAY.

*** We gladly print Dr. Barclay's letter, although the article, read in conjunction with the report of Mr. Jefferson's contribution on p. 1210 of the same issue, was hardly to be misunderstood.—ED. L.

PANEL COMMITTEE FOR THE COUNTY OF LONDON.—On June 23rd at a luncheon party, a presentation was made to Dr. Lauriston E. Shaw, Treasurer of the Panel Committee since its inception in 1913. The presentation consisted of an oak cabinet, a gramophone, and the Encyclopædia Britannica. Dr. H. J. Cardale, who presided and made the presentation, dwelt on Dr. Shaw's wise economy, persuasive tact, and zeal for the interests of panel practitioners. Dr. Claude Taylor spoke of the unique position held by Dr. Shaw on the Panel Committee. Not being himself a panel practitioner Dr. Shaw held an entirely disinterested position, and had contributed largely to the radical change in the attitude of the profession towards national health work. In response Dr. Shaw, after cordially thanking the committee on behalf of Mrs. Shaw and himself, recalled the early days of his life as a medical politician. He entirely disagreed with the attitude that medico-political work was less valuable than other forms of medical work. He placed medical activities in the following order of usefulness: (1) discovery and research; (2) medico-political work, which enabled researches to be made available for the whole community; (3) work which is restricted to the application of medical benefits to individual patients. The guiding principles of his medico-political life were: (1) the sense of the impossibility for the vast majority of people to give adequate remuneration for the services of their practitioner without some assistance in the direction of insurance; (2) the conviction that the general practitioner must be the first line of defence, and that additional services must be added in coöperation with his service and not substituted for it. These two principles he had found enthroned in the Insurance Act. Mrs. Shaw also replied.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

National Health Insurance Bill.

THE Government was defeated on Thursday, June 22nd, in a Standing Committee of the House of Commons, which was considering the National Insurance Bill. The measure, which was recently introduced by Sir ALFRED MOND (Minister of Health) proposes as a consequence of one of the recommendations of the Geddes Committee that the total cost of special grants, which amount to £1,800,000 annually, shall, apart from the Women's Equalisation Fund, which is to be abolished, be charged as from April 1st last to the Benefit Fund of approved societies until December 21st, 1923, when the existing contract with the medical profession terminates. —Mr. CAUTLEY moved an amendment to clause 1 with the object of putting the additional charge on the Central Fund instead of upon the Benefit Fund.—Sir A. MOND said he could not accept the amendment, because the Fund was quite insufficient to pay the money and would be left with a deficiency of £1,500,000, the amount required being £3,420,000.—After discussion, the amendment was carried against the Government by 20 votes to 14. The debate was adjourned in order to give the Government time to consider the position.

On Tuesday, June 27th, the Committee, on the motion of Sir A. MOND, agreed to a compromise amendment providing that £900,000 should be taken from the Central Fund, and the remainder from the Benefit Fund. The Committee stage was concluded and the Bill was ordered to be reported to the House.

HOUSE OF LORDS.

MONDAY, JUNE 26TH.

Milk and Dairies Amendment Bill.

The Earl of ONSLOW (Parliamentary Secretary to the Ministry of Health) moved the second reading of the Milk and Dairies Amendment Bill which seeks further to postpone the operation of the Milk and Dairies (Consolidation) Act, 1915, and the Milk and Dairies (Scotland) Act, 1914, to make further provision with regard to the sale of milk and for purposes connected therewith. He said that the 1915 measure was not being "scrapped" as had been supposed in some quarters. It was merely being postponed for a period of three years because at the present time it was impossible to face the expenditure that would be entailed if it was brought into operation. The 1915 Act imposed new duties on county councils and a Departmental Committee which was appointed in 1920 to investigate the cost of working the measure reported that it would require a sum of £704,000 per annum. The Ministry of Health also went into the question of cost and arrived at a figure which was a trifle less. But in addition to that large sum the compensation paid under the measure would amount to £150,000 a year, so that a total sum of about £850,000 per annum would be necessary if the 1915 Act were put into operation. That figure would tend to increase. The present Bill sought to do three things. First of all, it was designed to protect the consumer in respect of the sale of milk which was injurious to health; secondly, it would, he hoped, provide milk at a cheap rate free from bacterial contamination; and thirdly, it prohibited the sale of milk from cows which were suffering from tuberculosis of the udder.

Lord STRACHIE moved the rejection of the Bill on the ground that it was better to postpone legislation until it was possible to bring in a thoroughly good Bill.

Lord DYNEVOR supported the Bill.

After some discussion Lord STRACHIE withdrew his motion for rejection and the Bill was read a second time.

HOUSE OF COMMONS.

WEDNESDAY, JUNE 21ST.

Compensation for Medical Officers in Territorial Army.

Lieut.-Colonel FREMANTLE asked the Secretary of State for War what compensation was proposed for those D.A.D.M.S.'s of the Territorial Army whose appointments, originally made for a period of four years, had been prematurely terminated at the expiration of two years or less.—Lieut.-Colonel Sir R. A. SANDERS (Under Secretary to the War Office) replied: Those Deputy Assistant Directors of Medical Services of the Territorial Army whose appointments, originally made for a period of four years, have been prematurely terminated from March 1st last, will be given as compensation for the professional loss involved in the premature termination of their army contracts, a sum representing one-third of what they would have received in pay and allowances if they had been allowed to complete the term of their appointments.

Panel Practitioners and Lock-up Surgeries.

Sir JOHN LEIGH asked the Minister of Health whether he was aware that it was the practice of panel doctors in certain parts of London to lock up their surgeries after a certain hour and depart to other districts, and thus to be inaccessible to patients requiring immediate attention; if this practice was in accordance with the terms of their agreement under the National Insurance Act; and if he proposed to take any action in the matter.—Sir A. MOND replied: My attention has been called to certain cases of this kind and I am having further inquiry made. Such a practice would not be regarded as complying with the terms of service of insurance practitioners.

A Return of Slum Areas.

Mr. GILBERT asked the Minister of Health whether any circular had ever been issued by his department to local authorities asking them to make a return of all slum areas in their districts, and, if not, whether, in view of the reduced cost of building, it was proposed to urge all local authorities to consider the rebuilding of all slum areas possible in order to provide better housing accommodation and also building work for the unemployed at the present time.—Sir A. MOND replied: A return was obtained in 1919 showing the areas which, in the opinion of the local authorities, might have to be dealt with as unhealthy areas under the Housing of the Working Classes Act, 1890. Progress is being made with a number of schemes in various parts of the country already operative or in preparation, and negotiations are proceeding with other local authorities for the adoption of further schemes.

Local Authorities and the Blind.

Mr. FREDERICK ROBERTS asked the Minister of Health how many local authorities had not yet submitted schemes under the Blind Persons Act, 1920; how many schemes submitted had not yet been approved; and what action he had taken or proposed to take regarding those authorities which had not yet fulfilled their statutory duties.—Sir A. MOND replied: Thirty-two local authorities have not yet submitted schemes under the Blind Persons Act, 1920. All schemes submitted have been approved or promised approval subject to modifications. Twenty-seven authorities have schemes under consideration, and I trust that the remaining authorities, five in number, will reconsider their decision in the matter at an early date.

Medical and Dental Use of Cocaine.

Dr. M'DONALD asked the Minister of Health if he was aware that cocaine was not a drug which was essential to the medical and dental professions, owing to the manufacture of many less toxic substitutes; and would he therefore take steps to prohibit the importation of so pernicious a drug into this country, if necessary, by legislation.—Sir JOHN BAIRD (Under-Secretary of the Home Office) replied: The Home Office is in consultation with the Ministry of Health as to the need for cocaine in medical and dental practice, and I am not prepared at present to express any opinion as regards the suggestion in the first part of the question. As regards the second part of the question, the importation of cocaine, except under Home Office licence, is already prohibited.

Lunacy (Visiting Committees) Bill.

Sir ROBERT NEWMAN introduced a Bill to enable local authorities to co-opt members of visiting committees, and to provide for the appointment of women as members of visiting committees. The Bill was read a first time.

THURSDAY, JUNE 22ND.

Milk Supplied in Cafés.

Mr. TOWNLEY asked the Minister of Health whether there were any legal requirements in respect of the nature and quality of the milk which was supplied with tea in cafés and other places of refreshment, and if so, what measures were taken to enforce these requirements.—Sir A. MOND replied: I am advised that where a customer in a restaurant orders tea and does not specially ask for milk, there are no legal requirements as to the nature or quality of any milk which may be supplied.

Pension Appeals in Scotland.

Mr. DUNCAN GRAHAM asked the Secretary for Scotland the number of appeal cases that had been heard from the West of Scotland by the pensions appeal tribunal during the year 1921 and for the first three months of the present year, and what was the number that had been allowed.—Mr. MUNRO replied: The numbers of appeal cases from the West of Scotland that were heard, and finally decided by the pensions appeal tribunals for Scotland during the year 1921 and in the first three months of the present year were 2844 and 794 respectively. In 820 of these cases the appeal was allowed.

Education of Blind and Deaf Children.

Mr. STANTON asked the President of the Board of Education what his department proposed to do in regard to the future education of blind and deaf children; would the propoesd cuts in educational expenditure affect these children to their future training and development; and would these unfortunate children have special consideration from his department.—Mr. FISHER replied: I have had under my careful consideration the question of the education of blind and deaf children. I am glad to state that, notwithstanding the present financial difficulties, it will be possible to allow existing schools for such children to be utilised to the full extent of their accommodation.

Sick Leave of P.O. Savings Bank Clerks.

Lord HENRY CAVENDISH-BENTINCK asked the Postmaster-General what was the average number of days sick leave per head per annum for the women clerks in the Post Office Savings Bank in 1914 and in 1921 respectively.—Mr. PIKE PEASE (Assistant Postmaster-General) replied: The information asked for is as follows: 1914, 11·9; 1921, 18·1.

Pension Ministry Hospitals.

Sir JOHN LEIGH asked the Minister of Pensions how many war hospitals remain under the control of the Ministry of Pensions; how many have been closed during the past 12 months, and in how many cases are plans for closing in progress; and the number of patients on any selected date for the past three years.—Mr. MACPHERSON replied: The present number of Ministry hospitals is 52. Seventeen hospitals have been closed during the past 12 months, and it is proposed shortly to close two others. The number of in-patients in Ministry hospitals on June 3rd was approximately 10,000; on the same date in 1921 and 1920 the number was 11,700 and 7,650 respectively.

Special Diet for Tuberculous Cases.

Colonel BURN asked the Minister of Pensions if he would consider the suspension of the new regulation which, after July 1st, 1922, deprived pensioners in receipt of treatment allowance for tuberculous cases from drawing further supplies of special diet.—Mr. MACPHERSON replied: Special diet will still be provided in cases of pulmonary tuberculosis where the circumstances justify that concession.

MONDAY, JUNE 26TH.

Radium for Medical Purposes.

Sir EDWARD NICHOLL asked the Minister of Health whether, having regard to the established uses of radium for medical purposes and its tremendous possibilities and potentialities, he was making inquiries with the object of obtaining in the public interest this hitherto very scarce substance; and whether he was aware that considerable quantities of this commodity were to be found in this country, notably in Cornwall, but largely undeveloped.—Sir A. MOND replied: Radium salts are at present used, medically, for research and for the treatment of certain special morbid conditions. The Medical Research Council has a provisional supply at its disposal, and it may be assumed that there will be an increasing demand for radium. I am not, however, in a position to recommend the development of its production in any particular area, as that obviously is dependent upon geological and commercial considerations.

Disability Pensions.

Major COHEN asked the Minister of Pensions the total number of ex-Service men drawing disability pensions, divided as follows: under 10 per cent.; between 10 per cent. and 20 per cent.; between 20 per cent. and 50 per cent.; and over 50 per cent.—Major TRYON replied: The Royal Warrant does not provide for pension where the degree of disablement is assessed at less than 20 per cent.; but I may inform my hon. and gallant friend that about 120,000 men in this category are receiving final weekly allowances. Approximately 633,000 disability pensions assessed at from 20 to 50 per cent. (both inclusive), and about 107,000 assessed at over 50 per cent., are now in payment.

Quarantine Precautions at British Ports.

Lieut.-Colonel HILDER asked the Secretary of State for the Home Department whether the quarantine precautions against the introduction of small-pox, plague, and other infectious and contagious diseases in human kind were still enforced in the case of citizens of His Majesty's Dominions overseas, as well as in the case of foreigners.—Sir A. MOND replied: The Quarantine Acts were repealed in 1896. The measures now adopted for preventing the introduction of infectious disease into this country are based on the provisions of International Conventions, and no distinction is made between persons of British and foreign nationality.

Infanticide Bill.

The Infanticide Bill was read a third time and passed. This measure provides that a woman who wilfully causes the death of her newly born child, and has not fully recovered from giving birth to such child, and by reason thereof the balance of her mind is disturbed, she shall, notwithstanding that the circumstances were such that but for this Bill the offence would amount to murder, be guilty of infanticide, and be dealt with and punished as if she had been guilty of manslaughter of such child.

Medical News.

UNIVERSITY OF CAMBRIDGE.—At examinations held recently the following candidates were successful:—

THIRD EXAMINATION FOR MEDICAL AND SURGICAL DEGREES.

Part I., Surgery, Midwifery, and Gynæcology.—W. F. T. Adams, E. B. Brooke, A. E. Clark-Kennedy, B. H. Cole, L. B. Cole, A. L. Crockford, C. B. S. Fuller, H. D. Gardner, J. H. H. Gough, C. A. Horder, L. Lawn, J. H. Le Brasseur, G. S. Lund, F. H. Mather, T. D. Morgan, C. P. Oliver, C. V. Patrick, C. J. Penny, H. E. K. Reynolds, A. G. Story, J. A. Struthers, F. B. Sudbury, E. Tagoe, C. G. Taylor, T. M. Thomas, G. D. Thomson, N. G. Thomson, and R. H. Yolland.

Part II., Medicine, Pathology, and Pharmacology.—A. B. Bratton, S. P. Castell, H. Corsi, F. C. Cozens, J. C. Davies, L. S. Fry, H. D. Gardner, H. L. Garson, A. A. Gemmell, J. C. N. Harris, H. J. H. Hendley, R. C. Hewitt, T. L. Hillier, A. G. F. McArthur, T. D. Morgan, B. Mountain, A. D. Porter, A. E. Roche, H. W. Taylor, C. E. Whitting, and D. W. Winnicott.

UNIVERSITY OF DURHAM: FACULTY OF MEDICINE. At examinations recently held the following candidates were successful:—

THIRD EXAMINATION FOR DEGREES OF M.B., B.CH.

Materia Medica, Pharmacology and Pharmacy; Public Health; Medical Jurisprudence; Pathology and Elementary Bacteriology.—Thomas R. Aynsley, Kathleen A. M. Ayton, Elizabeth Bainbridge, Dorothy I. Brown, James R. Campbell, Joshua Carse, Oswald P. Chapman, Thomas L. J. Coxon, Ethel W. Daniels, Thomas Fraser, George A. Gilmour, Alec Hanson, James B. Hartley, Frances R. Henegan, Gordon C. Henry, James A. Hislop, Madge Hopper, Ronald Keenlyside (second-class honours), Nora W. Kirk, John W. C. Leech, Francis J. Lorriman, Frederick W. Marshall, Thomas H. Meek, Alan G. Ogilvie, Elsie L. Peet, Guy Punshon, Margaret Ranken, John Reay, Frank P. Rust, Matthew Ryle, James H. Saint (second-class honours), Joseph A. Stobbs, Thomas E. Stoker, Raymond L. Stubbs, Alfred Swindale, Geoffrey G. C. Taylor, Edwin F. D. Walker, and Hugh A. Wallace.

UNIVERSITY OF LONDON.—At a meeting of the Senate held on June 21st Mr. H. J. Waring, Dean of the Faculty of Medicine, Vice-President of St. Bartholomew's Hospital Medical College, was elected Vice-Chancellor for 1922–23 in succession to Sir Sydney Russell-Wells. A cordial vote of thanks was passed to Sir Sydney Russell-Wells for the services which he had rendered to the University as Vice-Chancellor since December, 1919.

Mr. J. H. Woodger, B.Sc. Lond., was appointed to the University Readership in Biology tenable at Middlesex Hospital Medical School. He was educated at University College, whence he graduated with second-class honours in zoology, and was awarded the Derby Research Scholarship. During the war he served in Mesopotamia. In 1917 he was appointed protozoologist to the Central Clinical Laboratory in Amara, and in 1919 assistant in zoology at University College, where since last year he has been senior assistant.

The Lindley Studentship for 1922, of the value of £120 and tenable in the Physiological Laboratory, has been awarded to Miss M. J. Wilson-Smith, B.Sc., of Royal Holloway College; and the University Studentship in Physiology for 1922–23, of the value of £50 and tenable in the Physiological Laboratory of the University or of one of its schools, to Miss M. M. A. Murray, B.Sc., of Bedford College.

UNIVERSITY OF LEEDS.—An important development has been made in the department of Pathology and Bacteriology. This department, with Prof. M. J. Stewart at its head, was reconstituted some few years ago under an arrangement between the University, the Leeds Corporation, and the General Infirmary, and conducts all the pathological and bacteriological work required by those bodies. The gift of £20,000 recently offered to the University of Leeds by Sir Edward Brotherton was earmarked for the furtherance of the study of bacteriology, with special reference to public health, and the University Council has now instituted a new professorship to be called "The Sir Edward Brotherton Chair of Bacteriology." The Council has elected Dr. J. W. McLeod, O.B.E., as the first holder of this chair. Dr. McLeod graduated in 1908 M.B., Ch.B., with commendation, at Glasgow University, where he gained the Coats Research Scholarship and worked for a year under Prof. R. Muir. In the following year he was awarded the John Reid Prize for the best piece of research work on a medical subject carried out by a student or graduate of Glasgow University. Later he was awarded a Carnegie Research Scholarship, which, however, he resigned after a short tenure in order to take service as assistant lecturer and demonstrator in pathology at the Medical School of the Charing Cross Hospital. He joined the R.A.M.C. in 1914, and in the following year took charge of a mobile bacteriological laboratory in France. In 1919 Dr. McLeod was appointed to the post of lecturer in bacteriology at the University of Leeds, and he has continued to hold that post until the present time. During his tenure of these various offices Dr. McLeod has carried out important research work in the field of bacteriology, and has published numerous papers dealing more especially with the bacteriology of influenza, dysentery, pneumonia, and the streptococcal infections.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH.—At a meeting held on June 20th, Sir Robert Philip, President, in the chair, the Victoria Jubilee Cullen Prize for the greatest benefit done to Practical Medicine was awarded, equally, to Dr. John Thomson and Dr. Norman Walker.

FOURTH ITALIAN CONGRESS OF RADIOLOGY.—This Congress took place in the Rizzoli Orthopædic Institute at Bologna on May 9th, 10th, and 11th, under the presidency of Prof. A. Busi, many leading radiologists sharing in the proceedings. Prof. Senator O. Corbino (Rome) read a paper on the therapeutic application of radio-physical principles. Prof. Balli (Modena) presented a report on the "Normal and Pathological Limits in the Radiology of the Digestive Apparatus," which gave rise to discussion. Among other communications were papers by Prof. Tandoia (Naples) on duodenal ulcer, and by Profs. Ceresole, Alessandrini, Maragliano, and others. Several discussions on deep therapy took place, with particular reference to technique and results obtained in treatment of malignant tumours. Rontgen therapy of malaria was discussed by Dr. Pais and Profs. Rossi (Parma) and Spagnolio (Messina). Prof. Gortan (Trieste) dealt with cerebral tumours, and Prof. Gavazzeni with Basedow's disease; 95 communications in all were presented to the Congress. During the Congress an exhibition of radiological instruments was held, in which many important manufacturing firms participated. At the general assembly of the members Prof. Senator O. Corbino was elected honorary president of the Society, Prof. Bertolotti (Turin) was elected president; Prof. Balli (Modena) vice-president; Prof. Ponzio, secretary-treasurer; Prof. Perussia (Milan), chief editor of the journal of the Society. Palermo was chosen as the place of the Fifth Congress, to be held in October, 1923, under the presidency of Prof. Scaduto.

EPSOM COLLEGE.—The sixty-ninth annual general meeting of the Governors of Epsom College was held on June 23rd at 49, Bedford-square, London, W.C., Sir Henry Morris, the treasurer, presiding. The scrutineers reported that the successful applicants for Pensionerships and Foundation Scholarships are: "Pugh" Pensionership, Evelyn O. Cox; Ordinary Pensionerships, Catherine A. Kindon, Louise B. Shells; Foundation Scholarships, Ian C. L. Watson, Robert C. Rees, John E. Stevenson, and John C. Edwards. It was also reported that William J. Downer and Frank J. Griffin would be appointed Foundation Scholars under By-law 24 at the council meeting to be held immediately after the annual general meeting, additional vacancies having been notified. In submitting the report of the Council to the Governors, Sir Henry Morris stated that owing to the small margin of profit on the income and expenditure account for the past year, and in view of the new scheme of superannuation allowances coming into operation as from Jan. 1st last, the Council had decided that the school fees of all boys entering the College after the summer term, 1922, should be raised as follows: sons of medical men from 100 guineas to £120; lay boys, from 120 guineas to £140; day boys, £40 to £45. He said that the total applications received for the mortgage debenture bonds of £100 each at 5 per cent. interest on the security of the College land and buildings amounted to £24,200, so that there were only eight more debenture bonds to be allotted. He expressed the cordial thanks of the Council to those friends who had responded to their application to help the College at a critical time. He also drew attention to the proposed alteration in By-law 36 governing the "France" Pensions Fund, in order to enable the Council to grant a bonus to the holders of "France" pensions when the full number of ten pensions were not being awarded. He hoped that the Council would very shortly put in hand the rebuilding of the nave of the chapel in harmony with the new chancel, as the cost of building had been materially reduced; the joint total of the War Memorial Fund and of the Chapel Building Fund available for this purpose was over £6300. Col. J. Paul Bush, a member of the Council, and honorary local secretary for Bristol, was elected a Vice-President of the College. At the close of business a cordial vote of thanks was proposed by Mr. Ernest Page, chairman of the Council, to Sir Henry Morris, for the great services which he renders to the College as treasurer. This was seconded by Sir William Church and carried by acclamation.

TUBERCULOSIS SOCIETY.—A meeting of the society will be held on Monday, July 3rd, at 7.30 P.M., at the Margaret-street Hospital, London, W.1., when a discussion on Care Work will be opened by Dr. J. Sorley, tuberculosis officer for Walthamstow.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—The special post-graduate course on diseases of children, as already announced, will begin on July 3rd and will continue throughout the week. The following hospitals will take part: East London Hospital for Children, Paddington Green Children's Hospital, Victoria Hospital for Children, Queen's Hospital for Children, and St. Marylebone General Dispensary, and the fee for the course is £1 4s. Those desiring to attend should apply to the Secretary to the Fellowship, 1, Wimpole-street, London, W. 1.

The next post-graduate lecture will be delivered by Dr J. Strickland Goodall at the house of the Royal Society of Medicine at 5 P.M., on July 3rd, the subject being So-called Functional Diseases of the Heart.

NEW COLONY FOR CONSUMPTIVES.—The Cheshire Joint County Committee of the British Red Cross Society and the Order of St. John of Jerusalem have acquired Wrenbury Hall (near Nantwich) and an estate of about 170 acres, where has been established the new Wrenbury Hall Tuberculosis Training Colony. By agreement with the Cheshire County Council, Wrenbury is to be handed over to the Council for maintenance as a home for consumptives, and developed, as opportunity offers, on the lines of a training colony. Patients are to be admitted from the county area, the county boroughs, and from certain Cheshire towns. Preference is to be given where possible to ex-Service men. The colony has been established as a memorial of the Red Cross and St. John work done during the war in the county. A grant towards the purchase was made by the Ministry of Health. The colony forms part of the county scheme for fighting tuberculosis; it was formally opened on June 24th by the Duchess of Westminster.

OPENING OF THE COWDRAY CLUB FOR NURSES.—The Cowdray Club was formally opened on June 23rd at 20, Cavendish-square, London, W., as a club for nurses and other professional women. Lady Cowdray's generous gift confers a benefit upon the nursing profession which should be far-reaching in its influence, affording an opportunity for intercourse with other women workers and for development along broad social lines. The house, originally the home of the Barrington family and more recently of Mr. H. H. Asquith, M.P., has, under the guidance of Mr. Edwin Cooper, been made commodious by the addition of an oak-panelled dining-room. Prior to the opening of the club the foundation-stone was laid for the new building of the College of Nursing which will be erected as the gift of Lord and Lady Cowdray at the rear of the Cowdray Club. This building has been designed with a view to the educational developments now rapidly taking place in the profession of nursing.

PASTEUR CENTENARY AND STRASBOURG EXHIBITION OF HYGIENE.—Preparations are now going forward for the celebration next year of the centenary of the birth of Pasteur. The main celebrations will be held at Strasbourg, where Pasteur made his early discoveries. A monument to the scientist will be erected in the grounds of the University; subscriptions from all parts of the world have been sent for this purpose. A historical exhibition of Pasteur's work, illustrating the successive stages of his scientific career, will be held, and is to be housed in a permanent museum. There will also be a collection of apparatus and documents belonging to the Pasteur Institute, Paris, to other Pasteur Institutes, and to various French and foreign laboratories, showing the development and extension of the bacteriological studies initiated by Pasteur. Lastly, there will be a great industrial and agricultural exhibition, displaying the advances made possible along those lines by Pasteur's work. A series of congresses will be held in Strasbourg during the period of the exhibition; the subjects will include tuberculosis, syphilis, cancer, child welfare, the birth-rate, hydrology, and zootechnics.

CONFERENCE ON INFANT WELFARE.—The programme of the conference on infant welfare to be held at Carnegie House, 117, Piccadilly, London, W. 1, under the auspices of the National Association for the Prevention of Infant Mortality and National Baby Week Council, on July 3rd, 4th, and 5th, has now been issued. The chairmen at the morning and afternoon sessions on July 3rd are Sir Frederick Willis and Dr. Eric Pritchard; on July 4th Dr. Janet Lane-Claypon and Dr. G. F. Still; and on July 5th, morning session, Sir Arthur Stanley. Among the subjects to be discussed are the Advisability of Block Grants; the Care, including Medical Attendance, of Children from 1 to 5 years of age; Rickets, and many other subjects of interest. At 7 P.M. and 8 P.M. on July 3rd, 4th, and 5th lectures will be given by Dr. John S. Fairbairn, Prof. Dr. L. Findlay, Dr. Eric Pritchard, Dr. C. E. M. Jones, Dr. C. W. Saleeby, and Dr. A. F. Tredgold. On July 4th the subject to be discussed at the afternoon session is, How Far should Treatment be Undertaken at an Infant Welfare Centre? The speakers will include Dr. G. F. Buchan and Mr. E. B. Turner. At 3.30 P.M. on July 5th a public meeting will be held for all interested in infant welfare work in the Council Chamber, Caxton Hall, Victoria-street, London, S.W., Lord Onslow presiding. Prof. E. L. Collis and Dr. C. W. Saleeby will speak on Child Welfare in terms of L.S.D. During the course of the conference visits will be paid to various institutions.

The fee for attendance at the whole conference is 10*s.* 6*d.* per person, and cards of admission to each session or to the lectures only can also be had. Further particulars of the conference may be obtained from Miss Halford, 117, Piccadilly, London, W. 1.

UNIVERSITY OF LIVERPOOL.—At a meeting of the Council on June 20th the following appointments were made: Emeritus Professor of Medicine, Prof. T. R. Glynn; Emeritus Professor of Surgery, Prof. W. Thelwall Thomas. Dr. J. Hill Abram, professor of therapeutics in the University of Liverpool, and senior honorary physician to the Liverpool Royal Infirmary, was appointed to the Chair of Medicine in succession to Prof. Glynn. Mr. R. E. Kelly, lecturer in practical surgery in the University of Liverpool and honorary surgeon to the Liverpool Royal Infirmary, was appointed Professor of Surgery in succession to Prof. Thelwall Thomas.

MANCHESTER ROYAL EYE HOSPITAL.—The 107th annual report states that the number of out-patients treated during the year was 33,336 and in-patients 2044. Compared with the previous year, there is a decrease of 5145 out-patients and 292 in-patients. This decrease is partly due to unemployment, which has made it impossible for many to attend for treatment, and unemployment has also led to fewer accidents to the eye in works and factories. The average number of new cases daily was 106; the number of accidents treated being 9821, giving an average number of 31 per day. The average stay for indoor patients was 19 days, and the average number of beds occupied 108. The operations exceeded 2300. The patients are drawn from over 120 districts outside the Manchester area, almost every Cheshire, Derbyshire, and Lancashire town being represented. As to the occupation of the patients, metal-workers and machinists accounted for 8225, labourers over 8000, warehousemen over 1000, clerks and typists over 1400, seamstresses over 600. The financial position of the hospital still remains a cause of anxiety, as there is a bank overdraft of £6879.

UNIVERSITY OF MANCHESTER.—The Council have appointed Dr. William W. C. Topley as Professor of Bacteriology and Director of the Public Health Laboratory. Dr. Topley at present holds the position of director of the Institute of Pathology and lecturer in bacteriology and pathology at Charing Cross Hospital, London. He graduated in the University of Cambridge, obtaining a first class in the Natural Science Tripos in 1907, graduated M.B., Ch.B. in 1911, and afterwards proceeded to the degrees of Master of Arts and Doctor of Medicine. He became M.R.C.S. in 1909 and F.R.C.P. in 1918; he was elected Murchison Scholar of the Royal College of Physicians in 1910 and Goulstonian lecturer in 1919. Dr. Topley held the post of demonstrator of morbid anatomy and assistant director of pathology at St. Thomas's Hospital until his appointment at Charing Cross Hospital. He was appointed bacteriologist under the R.A.M.C. Mission to Serbia in 1915, and has published a large number of articles on bacteriological problems.

The Council have also appointed Dr. John Shaw Dunn to the Procter Chair of Pathology and Pathological Anatomy, in succession to Prof. H. R. Dean. Dr. Shaw Dunn graduated with honours in medicine in 1905, and obtained the degree of M.D. with honours in 1912 in the University of Glasgow, where he was awarded the Bellahouston medal. He became clinical lecturer in pathology in the University of Glasgow and director of the Clinical Laboratories, Glasgow Western Infirmary. He was later appointed professor of pathology in the University of Birmingham, which post he now holds. During the war Dr. Dunn was a Brevet-Major in the Royal Army Medical Corps. He has published a number of contributions to pathological research.

THE LANCET: SUBSCRIPTION RATES.

INLAND	One Year	.. .. ..	£2	2	0
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Subscriptions may commence at any time and are payable in advance.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

Thursday, July 6th.

ANNUAL GENERAL MEETING OF FELLOWS: at 5 P.M. Election of Officers and Council, &c.

ANNUAL DINNER at the Hotel Victoria, Northumberland-avenue, W.C. 2, at 7.30 for 8 P.M. (Tickets, 12*s.* 6*d.* each, exclusive of wine.) Fellows may bring guests, and should send their names with cheque and all necessary particulars to the Secretary as soon as possible.

JENNER MEDAL: The Jenner Medal of the Society, on the recommendation of the Section of Epidemiology and State Medicine, has been awarded to John C. McVail, M.D., LL.D., and will be presented to him at the Annual Dinner.

Friday, July 7th.

OCCASIONAL LECTURE: at 5 P.M.
Dr. Alfred Hess (New York): The Effect of Light in the Prevention and Cure of Rickets.

MEDICO-LEGAL SOCIETY, 11, Chandos-street, W. 1.
TUESDAY, July 4th.—Council and Ordinary Meeting. 8.30 P.M., Paper by Sir William Willcox: Acute Arsenical Poisoning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE POST-GRADUATE LECTURES, 1, Wimpole-street, W. 1.
MONDAY, July 3rd.—5 P.M., Dr. J. Strickland Goodall: So-called Functional Disease of the Heart.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.
MONDAY, July 3rd.—10.30 A.M., Mr. Maingot: Surgical Pathology. 2.30 P.M., Dr. Paterson: Demonstration of Medical Cases. 5 P.M., Dr. Arthur Saunders: Gastric Ulcer and its Treatment.
TUESDAY.—12 noon, Mr. Sinclair: Intestinal Obstruction. 2.30 P.M., Mr. Tyrrell Gray: Demonstration Surgical Wards.
WEDNESDAY.—10 A.M., Dr. Arthur Saunders: Medical Diseases of Children. 2.30 P.M., Dr. Burnford: Demonstration Medical Wards. 5 P.M., Dr. Simson: Modern Developments in the Management of Labour.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Cases. 2.30 P.M., Mr. Maingot: Demonstration of Urinary Calculi. 5 P.M., Sir Cuthbert Wallace: Early Indications for Prostatectomy.
FRIDAY.—12.15 P.M., Dr. Burnford: Applied Pathology. 2.30 P.M., Dr. Pritchard: Demonstration Medical Wards. 5 P.M., Mr. Sinclair: Lumps in the Breast.
SATURDAY.—10 A.M., Dr. Arthur Saunders: Medical Diseases of Children.
Daily, 10 A.M. to 6 P.M. 2 P.M., In-patients, Out-patients, Operations, Special Departments.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N. 15.
MONDAY, July 3rd.—4.30 P.M., Dr. J. Browning Alexander: Clinical Significance of Pulmonary Symptoms—Cough.
TUESDAY.—4.30 P.M., Mr. C. H. Hayton: Acute Inflammatory Diseases of the Middle Ear.
WEDNESDAY.—4.30 P.M., Mr. N. B. B. Fleming: Ophthalmoscopic Work.
Daily, 2.30 P.M., In- and Out-patient Clinics, Operations, &c.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, Balham.
THURSDAY, July 6th.—4 P.M., Mr. Zachary Cope: Common Errors in Diagnosis in regard to the Abdomen.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C. 1.
THURSDAY, July 6th.—4 P.M., Dr. Still: Purpuras in Childhood.

MANCHESTER FRENCH HOSPITAL, 24, Acomb-street, Whitworth Park, Manchester.
THURSDAY, July 6th.—4.30 P.M., Mr. A. C. Magian: Post-Graduate Lecture on the Cure of Sterility in Women.

Appointments.

ALLAN, J., M.D. Edin., D.P.H., has been appointed Medical Officer to Charlton Post Office.

CAIGER, H., M.B. Lond., F.R.C.S. Eng., an additional Specialist Medical Referee under the Workmen's Compensation Act for County Court Circuit No. 13.

DAVIES, C. B., L.M.S.S.A. Lond., Certifying Surgeon under the Factory and Workshop Acts for Gnosall.

MORGAN, O. G., F.R.C.S. Eng., Ophthalmic Surgeon to the Italian Hospital, Queen-square, W.C.

TELFORD, E. D., B.C. Cantab., F.R.C.S., to the Chair of Systematic Surgery in the University of Manchester.

TURNER, MARY, M.B., Ch.B. Vict., Assistant School Medical Officer of Crewe.

Cheadle Royal Hospital for Mental Diseases: ROY, J. A. C., M.B., Ch.B. Vict., Resident Medical Superintendent; THOMSON, W. G., M.B., D.P.H. Aberd., Senior Assistant Medical Officer.

Vacancies.

For further information refer to the advertisement columns.

Bath, Royal United Hospital.—H.P. and Jun. H.S. £180 and £150 respectively.

Birmingham, Ministry of Pensions Hospital, Moseley.—Two Jun. M.O.'s. £350 each.

Birmingham Union, Dudley Rd. Hospital.—Res. Asst. M.O. £300.

Birmingham Union, Erdington House and Children's Homes.—Asst. M.O. £300 to £400.

Bolingbroke Hospital, Wandsworth Common, S.W.—H.S. £120.

Bradford Royal Eye and Ear Hospital.—Hon. Aural S. and Hon. Asst. Ophth. S.

Bristol General Hospital.—Hon. Dent. S.

Cambridge, Addenbrooke's Hospital.—H.S. £130.

Cancer Hospital, Fulham-road, S.W.—Asst. to Electrical and Radio-Therapeutic Department.

City of London Hospital for Diseases of Chest, Victoria Park, E.—Asst. M.O. £100.

Delhi, Lady Hardinge Memorial College.—Prof. in Pathology and Pathologist. Rs.750 per month. Two Med. Women. Rs.550 per month.

Devizes, Wilts County Asylum.—Asst. M.O. £350.

Doncaster Royal Infirmary and Dispensary.—Sen. H.S. and Jun. H.S. £220 and £175 respectively.

Dundee District Asylum.—Asst. M.O. £293.

East London Hospital for Children, Shadwell, E.—H.S. £125.

Freemasons Hospital and Nursing Home, 237, Fulham-road, S.W.—Res. M.O. £250.

Gloucestershire Royal Infirmary.—Asst. H.S. £150.

Hospital for Consumption and Diseases of Chest, Brompton, S.W. H.P. £50.

Macclesfield General Infirmary.—Sen. H.S. £200.

Manchester City.—M.O.H. £1700.

Manchester, Crumpsall Institution and Infirmary, Crescent-road.—A.M.O. £225.

Metropolitan Ear, Nose and Throat Hospital, Fitzroy-square.—Sen. Clin. Asst.

Miller General Hospital for South East London, Greenwich-road, S.E.—H.P. and H.S. Each £150.

Newcastle-on-Tyne Dispensary.—Res. M.O. £350.

Norfolk Education Committee.—Asst. Sch. M.O. £500.

Plymouth Guardians.—Res. M.O. £300.

Preston and County of Lancaster Royal Infirmary.—Res. Surg. O. £225.

Rhondda Urban District Council.—Dental Surgeon. £500.

Richmond, Surrey Royal Hospital.—H.S. £150.

Royal College of Surgeons of England.—Elections to Court of Examiners.

Royal Free Hospital, Gray's Inn-road, W.C.—H.P. £50.

Royal Northern Hospital, Holloway, N.—Res. M.O. £250.

Saffron Hill Maternity Centre.—Hon. P.

Sheffield Royal Infirmary.—Ophth. H.S. £150.

Southampton, Royal South Hants and Southampton Hospital.—H.P. £150.

South Shields, Ingham Infirmary.—Sen. and Jun. H.S.'s. £200 and £150 respectively.

Victoria Hospital for Children, Tite-street, Chelsea, S.W.—H.P. and H.S. £100 each.

Warrington Infirmary and Dispensary.—Sen. H.S. £250.

West Bromwich and District Hospital.—Res. Asst. H.S. £180.

West London Hospital, Hammersmith-road, W.—Hon. Med. Radiographer.

Westminster Hospital, Broad Sanctuary, S.W.—Asst. H.P. and Asst. H.S. £52.

Births, Marriages, and Deaths.

BIRTHS.

MARSHALL.—On June 25th, at 40, New End-square, N.W. 3, the wife of Squadron-Leader G. Struan Marshall, R.A.F. Medical Service, of a son.

MCMILLAN.—On June 14th, at the Bungalow, Dudley Road Hospital, Birmingham, the wife of Kenneth McMillan, F.R.C.S. Eng., of a son.

NAPIER-CLAVERING.—On the 28th June, at Stoke Green, near Slough, to Elizabeth (*née* Squire Sprigge), wife of Mark Napier-Clavering—a daughter.

READ.—On June 22nd, the wife of Harold Read, M.R.C.S., L.R.C.P., L.D.S., 17, Welbeck-street, W. 1, of a son.

SHATTOCK.—On June 22nd, at 38, Mecklenburgh-square, W.C., to Mrs. Shattock (F. Mackenzie, M.B., B.S.) and Clement E. Shattock, M.S., F.R.C.S.—a son.

MARRIAGES.

MILLIGAN—HALL.—On June 20th, at Bolton Abbey Church, William Hubert Milligan, M.R.C.S., L.R.C.P., to Constance Mary, only daughter of Mr. and Mrs. J. Arthur Hall, of Bury and Fairhaven.

DEATHS.

ROBERTSON.—On June 22nd, at Pevensey-road, St. Leonards-on-Sea, Alexander Milne Robertson, M.D., late of Hawea, Rochampton, S.W., aged 71.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

REPORT FOR 1920 OF THE SANITARY COMMISSIONER WITH THE GOVERNMENT OF MADRAS.

THE late appearance of this report is explained, in the Government review with which it is issued, by the fact that a large number of district and municipal returns were delayed as much as four months after their due date. The Director of Public Health (a title recently substituted for that of Sanitary Commissioner) has now been requested by Government to report monthly any recurrence of delay on the part of local authorities in submitting their returns.

Vital Statistics.

The Madras Registration of Births and Deaths Act of 1899 is in force only in certain parts of the Presidency, but whether the Act is in force or not the registration of vital statistics is conspicuously defective. In this connexion the Government remark that they "fail to understand the general indifference of local authorities to the vital statistics of the population entrusted to their care. Without a reasonably accurate record of births and deaths, it is quite impossible for any board or council to cope intelligently with the problems of maternity and infant welfare, or the prevention of preventable diseases both epidemic and endemic, such as cholera, small-pox, malaria, and diseases of the digestive or respiratory system. Even the policy adopted in regard to elementary education should be based on actuarial estimates. The cause of these defects in registration is being made the subject of special investigation by the Director of Public Health and his assistants, and it is hoped that the District Health Boards newly constituted in selected districts will direct their first attention to this fundamental section of public health administration. The cessation of vaccination during the hottest months of the year should set free throughout the Presidency a not inconsiderable staff of vaccinators and deputy inspectors for this work, and all local authorities are requested to place themselves in immediate touch with the Director of Public Health with a view to utilising the services of these vaccination officers for effecting a real improvement in the accuracy of registration. The Government would, however, impress on all members of local bodies that no efforts on the part of the provincial staff can possibly effect any substantial advance unless they are supported by the goodwill and personal influence of the members themselves. They hope that each and every member of all local bodies will interest himself in the birth-rate, death-rate, and rate of infant mortality in the ward, circle, or community which he represents, and take pride that the people for whom he is responsible realise the importance of correct information and its bearing on their own welfare."

It has been ascertained that the average birth-rate for the Presidency is about 42 to 46 per 1000, but few districts or municipalities register anything like this figure. In Nellore district, for instance, the birth-rate is returned as 13·3 per 1000, and there is little doubt but that more than half the actual births are never registered at all. The recorded death-rate of the Presidency for the year was 21·8 per 1000, as compared with 27·2 per 1000 in 1919, but while this figure is more approximately correct than that of the birth-rate, it is impossible to deny that more accurate registration would have given a considerably higher rate. Infant mortality showed a general improvement over 1919, the rates being 161·3 against 192·9 for rural areas and 228·2 against 246·2 for municipalities. Improvement in registration would possibly have the effect of reducing these figures, which in most districts and towns are estimated only on the registered minority of the actual births. In several municipalities the recorded infant mortality-rate was well over 300 per 1000 births, but only in Madras city was any serious attempt made to deal with the problem. The child welfare measures undertaken by the corporation yielded encouraging results. During the year under report 2026 infants were attended to at the Triplicane centre, against 1052 in the previous year. The number of labour cases conducted was also larger, and there was a general improvement in the work done at all of the three centres in the city. The infant death-rate in the city for the five years ending 1918 was 302·1, and that for 1919 was as high as 333·1. Whether the fall to 282·4 in 1920 was due to child welfare work cannot be proved, but it is hoped that this improvement will be permanent.

Cholera, Small-pox, and Plague.

The number of deaths from cholera fell from 93,262 to 31,139. The provincial cholera parties maintained by Government worked in all except six districts, but their utility was as usual impaired by the fact that they seldom reach an affected area until a cholera outbreak has attained to epidemic dimensions. In order to effect an improvement in this respect the Government have provisionally disbanded three parties and distributed the staff among five selected districts, where they will work under district health officers. By this decentralisation it is hoped to anticipate an epidemic in a particular locality. The number of deaths from small-pox fell from 41,732 to 13,699. The Government are convinced of the need for a more thorough insistence on vaccination, and hope that compulsion may before long be made universal. The death-roll from plague rose from 5645 in 1919 to 14,652 in 1920. The Government have called on the Director of Public Health to draw up a comprehensive programme of preventive measures, and in so doing to emphasise the inadequate use made of the powers conferred on collectors under the plague regulations in force outside Madras City.

Sanitation.

Under the heading of conservancy the Government review draws attention to "the disquieting results of the hookworm investigation conducted by the medical officers of the Rockefeller Foundation." Details of this work have already been published in THE LANCET; the problem of soil pollution is for local bodies to solve, the problem of adequate latrine accommodation is receiving the attention of a committee appointed by the Government—consisting of the Director of Public Health, the Director of Agriculture, the Sanitary Engineer, the Director of the King Institute, and the Commissioner of the Madras Corporation—which has been asked to investigate and advise as to the method by which sewage, &c., can be safely and usefully disposed of.

Towards the close of the year the Sanitary and Malaria Boards were replaced by a Board of Public Health, the members of which are the Minister in charge of Public Health (President), the Secretary to Government, Public Health Department, the Director of Public Health, the Sanitary Engineer, the Chief Engineer to Government, and the Surgeon-General. The Sanitary Engineer's report for the year is attached to the Sanitary Commissioner's report, and Government note that eight schemes of water-supply were drawn up in the year, and that 32 schemes of water-supply and 28 schemes of drainage were under preparation or investigation. Government and local bodies both find it almost impossible to proceed with these urgently necessary schemes, most of which involve the expenditure of large sums of money. Attached to the Government review are a number of useful annexures giving general birth-rates, death-rates, and infantile mortality-rates—for the year 1920 and quinquennial averages—for districts and municipalities, the rates in each annexure being arranged in numerical progression.

MEDICAL WORK IN RUSSIA.

Dr. Melville D. Mackenzie, who is at present acting as Senior Medical Officer to the International (Nansen) Relief Committee in Russia, has been working in close conjunction with Dr. Shemasko, Soviet Minister of Health, and with the Soviet public health authorities generally. Returns received by the Ministry of Health relating to the need of hospitals, disinfesting stations, &c., in infected areas are forwarded to the Committee, which also receives reports from its own representatives all over Russia, and stores are then allocated to the various relief units. "The need is terrible," writes Dr. Mackenzie, to a well-known medical Member of Parliament, "for drugs of all kinds, hospital linen, sheets, blankets, and nursing equipment. I am leaving . . . for the famine area of the Volga at Buzuluk, and hope to see the area about Saratov and the work at Samara. The health authorities have allotted three Russian doctors for our work in the Volga valley, and I understand I can get hold of ten medical students. Cholera has already broken out in the Volga valley and is raging in the Ukraine. . . . The Soviet authorities are doing all in their power to help, but the areas and population are so vast. . . . For a person interested in preventive medicine, epidemiology, and hospital equipment the opportunities are unique, and the need such as one can hardly imagine. Among other arrangements I hope to get about 250,000 persons inoculated against cholera in the Volga region. . . Vaccine is available, I have acquired by one means or another a large number of record syringes, and the personnel . . . will, I hope, be furnished by my ten Russian medical students. The medical scheme for the Buzuluk area includes: (1) a cleaning-up campaign, supported by issue of soap, cresol, disinfectants, and washing equipment; (2) a railway sanitary control for trains coming in from Siberia to the Volga regions, attached to which will, I hope, be a small 20-bed hospital to take off cases from the trains; (3) issuing rations to the personnel of hospitals . . . to assist these to keep open; (4) equipment of hospitals generally; (5) an extensive anti-cholera vaccination campaign. . . . All one can do helps. I need not dilate on the conditions existing in the famine areas—it is hell let loose."

STAMMERING—WHAT IS IT?

To the Editor of THE LANCET.

SIR,—I read Miss Behnke's letter in your issue of June 3rd with great interest, but I should like to reply to four statements which she made. Miss Behnke says: In the *majority* of cases stammering develops after a nervous shock or an illness, prior to which there has been no sign of it, and frequently no other stammering in the family. Also, that in the majority of cases stammering is due to diaphragmatic spasm.

My own experience is rather different, and I have taken the following figures from all the cases which have come to me for the treatment of stammering during the last three years: Stammering increased or caused by shock or illness, 26 per cent.; cases in which one of the parents stammered, 22 per cent.; stammering with diaphragmatic spasm present, 42 per cent.

Now, Miss Behnke says that the diaphragmatic spasm is due to *nervousness*. I am in complete agreement, but I can think of nothing more likely to allay that nervousness than to teach a firm, resonant tone of voice, which, when employed, makes a stammer *impossible*. Needless to say, breathing exercises must be taught at the same time to gain the control and even use of the diaphragm. In my original article which appeared on May 13th space did not allow me to describe a series of breathing exercises, but I quote my own words: "Breathing must be mentioned first, for without a firm and even supply of breath the vocal cords will not vibrate properly"; and, "Taking it for granted then that the system of deep breathing has been mastered, we pass on to the more technical question of *vocal tone*." Taking my figures for the last three years again, I find that "lack of coördination between the vocal and articulatory mechanisms" has been the primary cause of the stammer in 77·8 per cent. of my cases, and that teaching a firm, resonant tone of voice together with the necessary breathing exercises has proved effective in every case. These figures are of interest when compared with Miss Behnke's statement that "lack of coördination between the vocal and articulatory mechanisms applies only to *a limited proportion of cases*."

I am, Sir, yours faithfully,

H. ST. JOHN RUMSEY, M.A. Cantab.

41, Gloucester-terrace, Hyde Park, W., June 20th, 1922.

To the Editor of THE LANCET.

SIR,—I agree with Dr. V. E. Sorapure that the spasm of stammering can be overcome, in the vast majority of cases, by the teaching of breath control, but I do not agree with him when he says that this falls within the scope of the general practitioner. It seems to me that the teaching of diaphragmatic breath control is as special a subject as are the closely related sciences of voice production and elocution. Not only does efficient diaphragmatic control cure the sufferer of his attempts to speak and inspire at the same moment, but rhythmic diaphragmatic exercises are the best means of combating the emotional state, which is such a prominent feature of these cases. Attempts to teach diaphragmatic breath control by an inexperienced person, especially if he has the wrong personality, may do more harm than good.

I am, Sir, yours faithfully,

C. CASSIDY, M.B., B.Ch. Cantab.

Gloucester-walk, Campden Hill, W., June 24th, 1922.

*** In reply to Dr. Sorapure, Miss K. E. Behnke also writes to point out that the method of treatment he has adopted, namely, that laid before the Neurological Society in 1911–12 by Maloney of New York, is apparently the same in principle as that evolved by her father, the late Mr. Emil Behnke, as far back as 1882.—ED. L.

ILLUMINATING ENGINEERING SOCIETY.

THE report of the Council for the session November, 1921–May, 1922, presented to the Society at the recent annual meeting, contains several references of medical interest. During April a meeting of the Society was held jointly with the Sections of Surgery and Ophthalmology of the Royal Society of Medicine, and a discussion on "The Use of Light in Hospitals" was introduced by Mr. John Darch.[1] The report states that a list of queries inviting comment on a number of problems has been prepared for circulation, and will, it is hoped, prove useful in promoting a general understanding of the chief principles to be adopted in the lighting of hospitals. The meetings of the Society during the session under review have been particularly fruitful in opening up possibilities of joint action with other bodies, both medical and commercial. Joint committees are studying the subjects of lighting of kinema studios, glare from motor headlights, railway lighting, &c. The Society's Standing Committee on Photometry and Allied Subjects is coöperating with the Advisory Committee on Smoke Abatement attached to the Meteorological Office. Reference is made to the appointment by the Medical Research Council of a committee to advise them on the promotion of research into the biological action of light; the Society are awaiting with interest the results of this appointment. The Medical Research Council's recent report (Special Series No. 65) on Miners' Nystagmus is quoted as confirming the Society's conclusion relating to the causation of that disease by inadequate illumination. Methods of coöperation in dealing with industrial lighting on an international basis have been discussed with Dr. L. Carozzi, a corresponding member of the Society, and a member of the Section of Industrial Hygiene of the International Labour Office of the League of Nations at Geneva.

[1] An abstract of Mr. Darch's paper and a report of the discussion appeared in THE LANCET, May 6th, 1922, p. 925.

THE CLIMATE OF EAST ANGLIA.

MOST foreign climates have been classified and scheduled with careful "indications" and "contra-indications" for their use in various classes of disordered health. While home climates have never been treated in the same drastic way, it is common knowledge that many people derive special advantage from spending their annual holiday in some particular part of the kingdom. The eastern counties have a well-earned repute for low rainfall and high degree of insolation during the summer months, combined with a freshness when the wind blows from eastward, as it often does. The attractive guide-book edited by Percy Lindley and issued by the Great Eastern Railway Company at the price of 6*d*. will serve to introduce those who do not know them to the amenities and beauties of East Anglia. The booklet, which is entitled "Seaside and Countryside in East Anglia," and is lavishly illustrated, can be obtained from the Publicity Department, Liverpool-street Station, London, E.C.

SWEETBREADS IN INVALID COOKERY.

SINCE sweetbread is such a time-honoured ingredient of the diet of the wealthy sick it is remarkable that there is still some confusion as to what gland of what animal is sold by butchers under this name. In *Food and Cookery and the Catering World* for June, 1922, an attempt, not too successful, is made to clear up the point, since it is stated that the "sweetbreads are the glands used by the young calf in sucking." It is admitted that there are two kinds of sweetbreads sold—the "heart" sweetbread and the "throat" sweetbread—from two distinct animals, the lamb and the calf, and it needs no unusual perspicacity to recognise that unless the public knows exactly what is required a patient may not be getting the easily digested delicacy which his medical adviser has ordered. The thymus of the sucking calf, not its pancreas, is apparently the most tender of the glands commonly sold as sweetbread, and should be specified for invalids, whereas the pancreas or even the salivary glands of calves and sheep are commonly and successfully used in restaurants for made-up dishes.

BIRTH CONTROL AND THE BIRTH-RATE.

"THE decline of a community is but the physical expression of a moral change." This is the single positive contribution to the study of birth-rate which we find in Dr. Halliday Sutherland's "Statement of Christian Doctrine against the Neo-Malthusians." (London: Harding and More, Ltd. 1922. Pp. 156. 6*s*.) The thesis is supported by evidence of the comparative prolificacy of Roman Catholic communities, the comparison being made with the other Christian peoples and with the Jews. It would be interesting to know whether the morality of some of the non-Christian peoples, if we accept birth-rates as a test of morality, might not come out even higher. It may, however, hardly be just to dwell on this positive thesis, as it were an accident in the course of a book, the real object of which is to confound the Neo-Malthusians. Some of the arguments directed to this end are perfectly good, indeed more than one has been taken, with due acknowledgment, from the pages of THE LANCET, and frequently the case which Dr. Sutherland states on behalf of his enemies is afterwards ruthlessly destroyed. As is inevitable, however, in this kind of controversy, we are left in doubt as to whether some of the enemy, those perhaps most worth listening to, might not have stated a different case on their own behalf.

T. J.—The book has been out of print for over 20 years.

WE are asked to call the attention of any who have votes for the British Home and Hospital for Incurables at Streatham, that Dr. Adolphe Harrison Thomas, M.D., C.M. Edin., B.Sc. Public Health, is a candidate for a vacancy. Dr. Thomas, who is 72 years of age, was recently medical officer and public vaccinator for the Taunton Union, and at one time medical officer of health of Vancouver. Votes may be sent to the Secretary of the Hospital at 72, Cheapside, London, E.C.